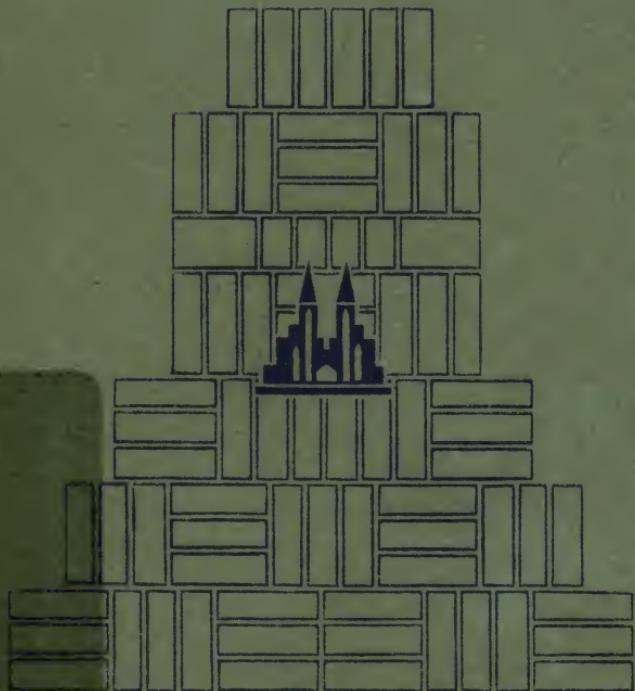


BRICKLAYING FOR BEGINNERS

WILLIAM FROST



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FOR

BEGINNERS

IS REALLY

BRICKLAYING

FOR

BEGINNERS

It presupposes no previous
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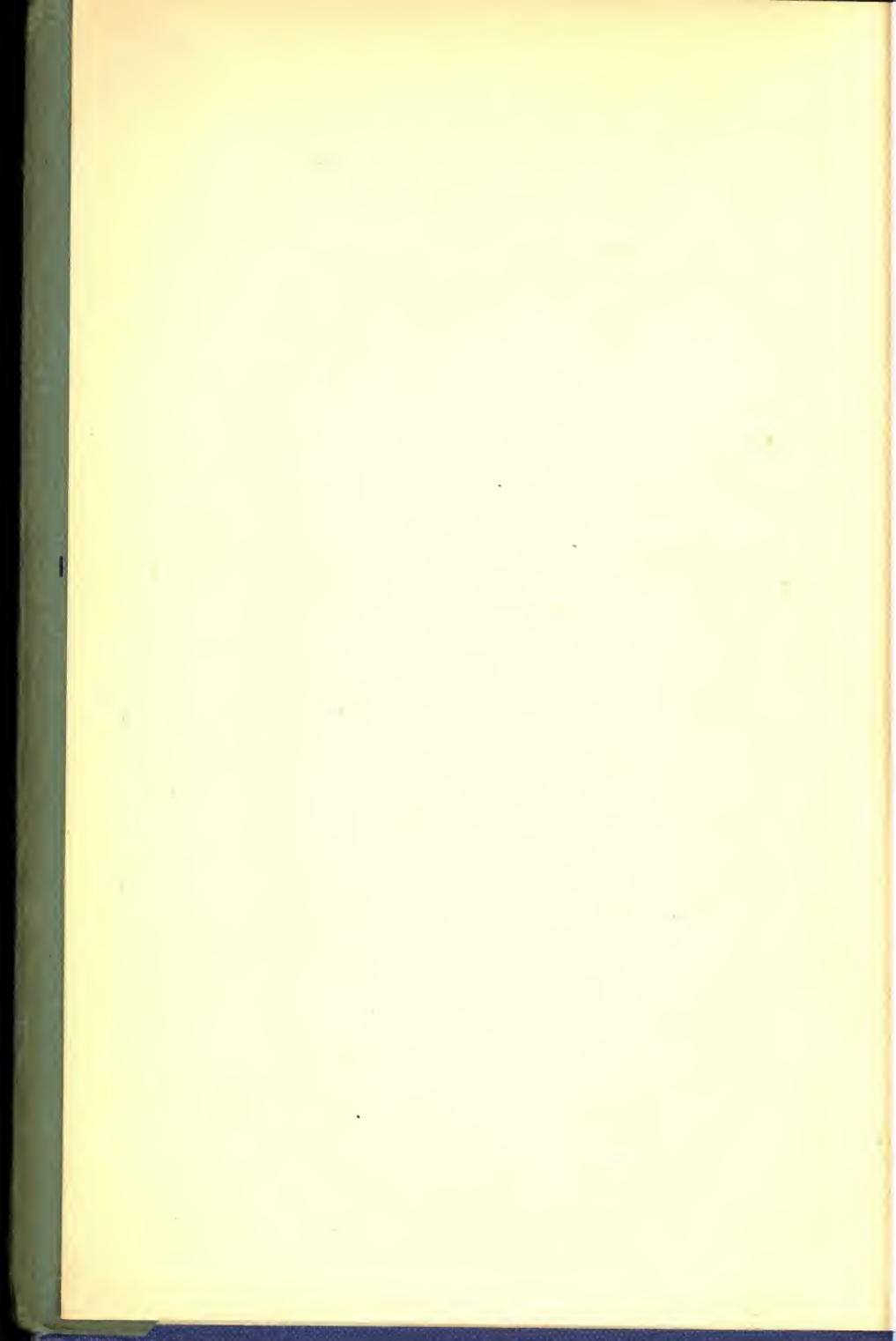
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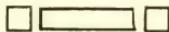
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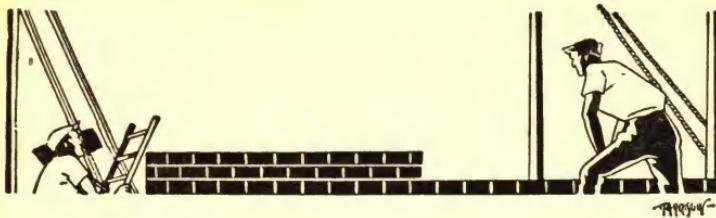
BRICKLAYING
FOR BEGINNERS



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BRICKLAYING FOR BEGINNERS

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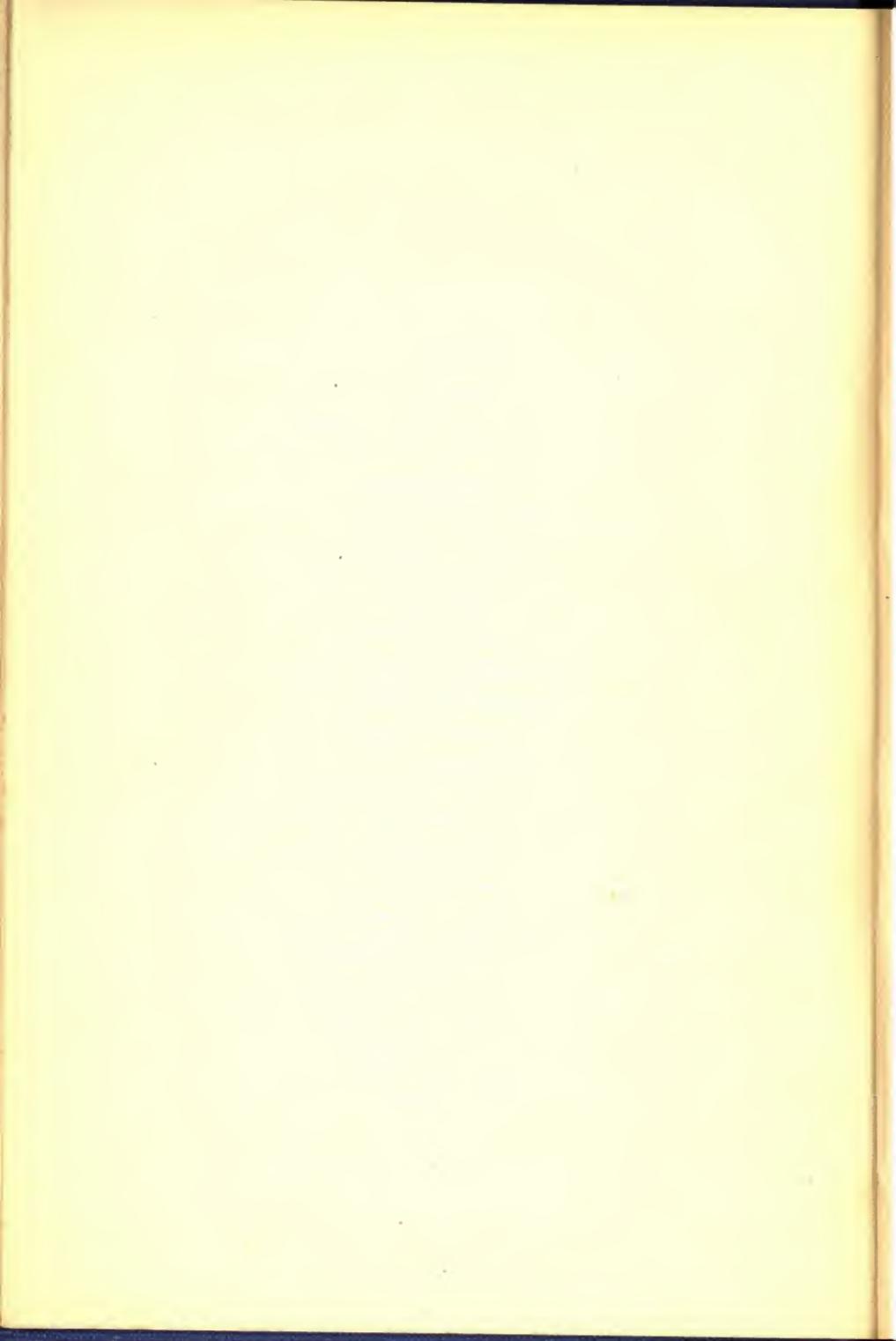
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INTRODUCTION

THE WORD "beginner" in relation to any relevant craft applies to the young person or apprentice who has entered or is about to enter a section of the building trade. One of the most important sections of the building industry is the ancient craft of bricklaying. It is with the express purpose of giving help and advice to the beginner in bricklaying that I am writing this short treatise. During my career in the building trade I have had the opportunity first of working as an apprentice, then as craftsman, foreman bricklayer, general foreman, and eventually as clerk of works. During the last few years I have been a lecturer and instructor in bricklaying, and during this period I have formed the opinion that the most important stage of a person's career is the beginning, for on this the making of a good craftsman largely depends. It is very important that he should be given sound advice on practical lines, at this important stage, which will enable him to lay a sound foundation on which he will be able to build his future career. In order to obtain this he should be taught the rudimentary, practical and theoretical points on a graduated scale which will enable him to start on a sound basis. The beginner should first be taught about the brick and the names of the various parts and shapes into which it is divided for the purpose

of bonding, then how to place bricks in their correct positions by drawing various simple examples of bond. A few simple rules will help him to accomplish this. He should then acquire the names of the various tools, what they are used for, the construction of them, the proper methods of handling them, and last, but not least, the practical application of the tools to the actual construction in which they are used. He should then be taught to read the scale rule, by which he will be able to draw to scale simple examples of bonding bricks. By studying the points which I have mentioned, the beginner will soon form a basis on which he can build, and it is only by this practical and graduated method of teaching him the rudimentary and vital points of his trade that he will succeed in the craft upon which he has entered.

W. F.

CHAPTER I

PHYSICAL ATTRIBUTES REQUIRED BY THE BEGINNER

BRICKLAYING IS A CRAFT in which certain physical attributes are required, and it is necessary to possess or attain them in order to become a master of the craft. The young person who has the intention of taking up bricklaying as a trade should in the first place be a normally healthy person. He should possess good eyesight, be of a reasonable height, fairly strong in the hands, arms, wrist and back, and good hearing will also be to his advantage. Bricklayers no doubt are amongst the healthiest men in the building industry. The beginner taking up the trade, if in normal good health, will no doubt develop into a robust and strong man, mainly because of his life in the open air and the exercise he receives during the day whilst carrying on his occupation. He should be in normal health to withstand the various elements of the weather to which he is exposed during his daily occupation.

Good eyesight is essential to the bricklayer, as he uses it practically all the time during his working day. For instance, when reading the level, when plumbing a quoin, and every time he picks up a brick, he is constantly using his eyes throughout the day.

Height is an advantage in some cases, and a disadvantage in others. For instance, taking the case of a very tall person, he has a distinct advantage over a short person when laying bricks along a wall which is nearing completion to the height of a scaffold; the tall person can lay the bricks with comparative ease at this level, but the short one has to stretch up to the full limit to lay the brick at the same level in its correct position. The short person has the advantage over the tall one when the wall is only one or two courses in height from the foundations; he is able to bend down and place his bricks on the low level of the wall with usually much more ease than the tall person. So advantages and disadvantages remain on both sides. The happy medium in height would be about 5ft. 7in. to 5ft. 9in. in height. He should be strong in the hands to enable him to keep continually picking up the bricks all day long—of course the grip gradually develops by continual practice. Strength is also gradually developed in the arm and the wrist by the continual use of the trowel in spreading the beds of mortar. The muscles of the back are developed and strengthened by the continual movement of the trunk of the body in a forward and backward movement to the ground in order to pick up the bricks, and place them in position on the wall. There is no other trade which requires this particular movement in its operation. A good sense of hearing is an advantage, as it can be used to listen to the ring of a brick, when judging whether the brick is a good one by its metallic ring, or whether it produces a very dull sound and is then judged to be a bad one. A good sense of hearing is of special advantage in these days of hurry and scurry, and just that keen sense of

PHYSICAL ATTRIBUTES REQUIRED II

hearing sometimes saves one from an accident, due to another's negligence; and it is a great advantage when receiving an order to carry out a particular piece of work.

Continual practice is essential in order to attain the physical requirements which I have just mentioned, and those people who start when they are young have a much better chance of doing so than the men who begin learning the craft at a later period.

Some beginners show a much more general aptitude towards the trade, and have a much better and natural way of holding and using the tools than others, and therefore learn more quickly. A young fellow who likes the trade and the outdoor life is the one most likely to succeed at it.



CHAPTER II

THE BRICK AND ITS VARIOUS PARTS

THE BRICK DESCRIBED in simple language is a rectangular-shaped piece of burnt clay, which is used as a unit in conjunction with mortar to form various constructions of brickwork.

A beginner should know what a brick really is, what it is used for, and its various parts or shapes, before he actually attempts the practice of laying or bedding bricks. There are actually four general shapes with which the beginner should become thoroughly accustomed for ordinary brickwork practice; later on he can learn the rarer shapes. *Fig. 1* is an illustration showing the isometric drawing of a brick. An isometric drawing is one showing equality of measure. This is shown to illustrate the various parts of the brick, and each is lettered, so as to make it plain for the beginner to see at a glance the parts which are being explained. The measurements of the whole brick are 9in. \times 4½in. \times 3in., that is the length, width and thickness of the brick. The whole of that face area of the brick which measures 9in. \times 3in. is known as a stretcher, and, when the brick is laid in this way, it is called the stretcher face in a course (this is marked A). Another face of the brick which measures 4½in. \times 3in. is known as a header (this

is marked B) and is called the header face, when laid in the course in this position. The bottom surface of the brick is known as the bed of the brick (this is marked C). The other two faces of the brick, which are not actually seen in this drawing, are marked with shaded lines, which depict the header and stretcher faces at end and back of brick. The other portion of the brick is the top, which has a recess in it known as the frog of the brick (this is marked D). When the brick is placed on a corner or quoin of a wall, it is known as the quoin brick. In this case, two faces are shown, viz. the header on one face of the wall, and the stretcher on the return face of the wall, the back header and stretcher face not being seen. When headers are laid in a course, the header face is seen only, the back header face and the two stretcher faces not being seen. When the stretcher

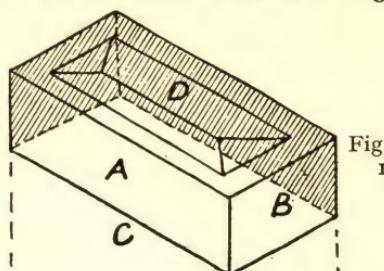


Fig. 1

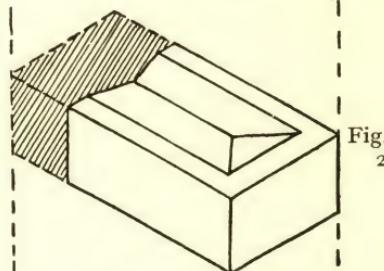


Fig. 2

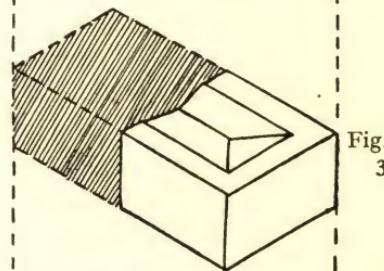


Fig. 3

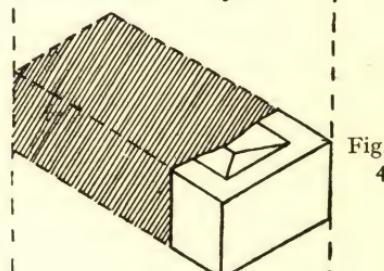


Fig. 4

face is laid in a course, the two header faces and one stretcher face are not seen. The external angles of the brick are called "Arrises." The brick has to be cut into varying lengths at times, due to certain types of bonds which are required, various recesses and walls of unequal brick measurement in length, which often require a part of the whole brick to make up the correct length.

Fig. 2 is an illustration showing a three-quarter length of the whole brick. This is usually known as a three-quarter and measures $6\frac{3}{4}$ in. in length, 4 in. in width and 3 in. in thickness. Again the portion which has been cut away is shown by shaded lines.

Fig. 3 is an illustration showing half the length of the whole brick, which is known as a half-brick or a bat, and measures $4\frac{1}{2}$ in. $\times 4\frac{1}{2}$ in. $\times 3$ in. The portion which has been cut away is shown by shaded lines.

Fig. 4 is an illustration showing a quarter of the length of the whole brick, and is known as a closer. These are usually cut from half-bricks or bats. The shaded portion shows the remainder which makes up the bat. If care is taken two closers can sometimes be cut from the half-brick, and so eliminate waste.

Thus it will be clearly seen that the closer is equal to a quarter of the length of the whole brick, the bat equal to one half of the length of the whole brick, and the three-quarter equal to three-quarters of the length of the whole brick. Taking the whole brick as 9 in. in length, these quarter, half, and three-quarter lengths should be easy to memorise. There are various other shapes which are used in the construction of brickwork, but the above are the main parts or shapes that will be required for elementary practice. The plan of full

size shapes of bricks cut out of cardboard may be used by the beginner to practise the bonding of simple wall examples.

VARIOUS KINDS OF BRICKS AND THEIR USES FOR BEGINNERS

Fletton Bricks. The colour of these bricks are a reddish pink; they are machine made and kiln burnt; they are uniform in size and shape with good finished arrises. The material from which they are made is very compact throughout when the brick is burnt. They are a good general brick, used for all kinds of common brickwork, such as foundations, small and large factories, etc. This type of brick is adaptable to a weather or struck joint finish.

Red Bricks. There are one or two varieties of red bricks, such as sand faced reds, the ordinary building red and the red pressed bricks. *Sand Faced Reds* are kiln burnt, uniform in shape and colour, and their external faces are sanded to produce a rough texture, made from a specially prepared clay. *Ordinary Building Reds.* These bricks are either hand or machine made and burnt in a kiln. They are generally uniform in shape, size and colour. They are made from unwashed clay and the red colour is caused by chemical properties used in their manufacture during the burning of the bricks. *Red Pressed Bricks.* These bricks are red in colour, made from a specially prepared clay, and generally possess two frogs; they are uniform in shape and colour with a smooth finished surface on all the external faces. The noted Southwater Brick is a typical

example of the pressed brick. All the red bricks just mentioned are generally used for good face work. Red pressed bricks look best when they are finished with a neat cement and sand weather joint, and the sand-faced brick is adaptable to the rough flush joint which matches the rough face texture of the bricks.

Red Rubbers. This type of brick is manufactured from a specially prepared clay, which contains a large percentage of silica. The colour varies from a light pink shade to deep plum colours, the size is much larger than the ordinary brick to allow for cutting into shape with the wire saw, and rubbed to various finishes on a york stone. These special bricks are used for ornamental work, such as arches and other ornate examples of brickwork. They are bedded usually in fine lime putty to produce a neat fine joint.

Stock Bricks. These bricks are usually uniform in size and colour, the latter varying from a light yellow to a deep golden brown; made from a prepared clay, the colour changing according to the degree of burning in the kiln. They are either made by hand or machine, and are used for good class face work, and the best adaptable joint for this type of brick is the sand and cement weather joint. *Malm Rubbers* are under the stock class of brick, yellow in colour, and uniform in shape and size, made from a specially prepared clay and have a compact fine texture throughout the brick. They can be cut and rubbed to required sizes, and used generally in the construction of arches.

Blue Staffordshire Bricks. This brick is deep blue in colour and made from a very dense clay, containing about 8 per cent. of iron oxide. They are uniform in size, shape, and colour, very heavy and usually contain

two frogs; they are used for constructional work, and other structures where strength is essential.

White Suffolks. These bricks are a very light cream colour, made from a specially prepared gault clay. Their texture is fine and compact and they can be cut and rubbed into various shapes. They are uniform in shape and size and are generally used for arches. A lime putty joint is suitable for this brick about $\frac{1}{8}$ in. or $\frac{1}{4}$ in. in thickness; usually contain one frog.

Salt Glazed Bricks. These bricks are uniform in shape, colour, and size, the colour being brown. They usually contain two frogs, are made from a specially prepared clay, and the glazing on the brick surfaces is formed by throwing salt into the fire of the kiln. The salt vapourises, caused by the heat in the kiln, and separates into fine particles, which eventually form a fine vitreous glaze all over the exposed surfaces of the bricks. The bricks are used in lavatories and corridors where a sanitary wall surface is required; they can be washed down and cleaned quite easily with water. The joint most suitable for this type of brick is a neat $\frac{1}{8}$ in. cement joint.

Sand Lime Bricks. These bricks are white in colour and the texture is hard and compact throughout. They are uniform in shape and size. This type of brick consists of a composition of lime and sand (1 part of lime to 10 parts of sand); they are made by a special process. The materials are finely ground and mixed with water, then boiled in a mixer, conveyed to a storage tank, and the mixture left to thoroughly slake. After that process it is compressed by machines into the brick shapes, then subjected to a pressure of 100 to 140 tons per square inch, after which they are removed to a

special chamber and subjected to a steam pressure of 125 lbs. per square inch and when hardened off they are ready for use. These bricks are generally used in situations such as areas, etc. where the maximum of light is required.

Fire Bricks. These bricks are very light brown and sometimes white in colour. They are made from a specially prepared fire-clay, known as a refractory clay, which is obtained from the mines and weathered for a time (usually about two years). It is then crushed in a rotary crusher, and carried to the grinding mill, afterwards being tempered in the tempering mill, which produces a plastic mixture. It is allowed to stand and sweat for a few days, and is then ready for hand or machine moulding. It is taken to the kiln to be burnt to a very high temperature, about 2,500°F. The bricks are usually uniform in size, shape and colour. They are used for various types of brickwork in fire construction work.

Glazed or Enamelled Bricks. Made from specially prepared clay, uniform in size, shape and colour, but a variety of colours can be obtained. The glaze sometimes placed on the surfaces, consists of a thin coat of enamel placed on the raw moulded bricks before they are burnt, or is sometimes placed on the surfaces of the bricks when they are partially burnt. The former method is the best and most durable. These bricks are used for sanitary wall surfaces; they usually contain two frogs. The joint most suitable for glaze brickwork is the $\frac{1}{8}$ in. thickness composed of neat cement which produces a very good finish.

CHAPTER III

THE TOOLS

THEIR USES, CONSTRUCTION AND HANDLING

WHEN THE BEGINNER is about to start bricklaying, he will require the principal tools. These are not very costly, but at the same time he should be advised as to the selection necessary for a start. It is my intention in the next few pages to give the names of the tools, the kind of special work for which each tool is used, the proper construction of the tools, the correct methods of handling, and the practical methods of application. It is necessary and important to keep the tools very clean; they can be handled better, and the beginner is able to keep his work clean and tidy. A tool bag should be procured in which the tools can be placed when not in use. The names of the tools in general use are as follows:

The Brick Trowel, Plumb-rule, Straight-edge, Pair of Pins and Line, Club Hammer, Bolster, Chisels, Square, Bevel, Pointing Trowel, Hawk, Frenchman, Levels, Two-foot Rule, Brick Hammer, and Scutch.

I will describe each tool separately and a sketch will be shown of each one; illustrations of the actual

handling of the various tools will be shown also, and it is hoped that by this method the beginner will at once see and understand how to use the tool in a correct way, and then by practice can soon become efficient in handling it.

The *Brick Trowel*. This is the most important tool used by the bricklayer and the one which is in use almost continuously. *Fig. 5* shows an illustration of the brick trowel. It is used in the first place for taking mortar from the mortar board and laying it on the

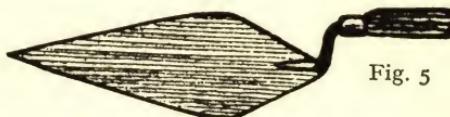


Fig. 5

wall, and then for spreading the bed of mortar into an even, horizontal bed on to which a brick is eventually laid by the bricklayer. The handle of the trowel is sometimes used in order to tap the brick into its final position on the wall, and then again the blade serves to remove the surplus mortar which is pressed out of the joint after the brick is so laid. The brick trowel is sometimes used for striking the joints of the brickwork; it is again brought into use for the cutting of bricks into half bricks, three-quarters, closers, or other shapes which are required. It is also required for finally flushing up the internal joints of the wall; so you will quite understand that the brick trowel hardly ever leaves the bricklayer's hands.

The construction of the brick trowel is simple. It consists of a thin blade of steel, angular in shape, terminating at one end in a point and at the other end in a shaped piece of steel, called the shank, which is raised

above the blade in order to form a lift. On to this shank a wooden handle is fixed, terminating with a steel ferrule at the shank end; this handle enables the bricklayer to obtain a firm grip when picking up mortar from the board.

Fig. 6 is an illustration showing the correct method of holding the brick trowel. It will be noticed that the hand is gripping the handle, the thumb being in a position on the top of the steel ferrule and the four fingers underneath the handle, the thumb directing the movements of the trowel caused by those of the hand working from the wrist and forearm.

The 10in. brick trowel is the most convenient size for the beginner, and will not tire the user's wrist in using it; a larger size can be tried when one gets thoroughly accustomed to handling the trowel. In order to become proficient in the art of laying bricks the young person should know the tool he is using, should know what kind of work it has to accomplish, know the construction of it, and above all should know how to handle it correctly to become a master of his craft. I specially emphasise these vital points which apply to the brick trowel and all the other tools.

The beginner can by studying these points soon form a base upon which he can work, and by this method will find the work much easier when he comes to the actual laying of the bricks. This is the only sure method of obtaining good practical knowledge in the most important stage of his career. We will now pass on and give full details and points about the other tools.

Fig. 7 is an illustration showing the *Plumb-rule*, which is used for obtaining the vertical positions of walls. In construction it consists of a combination

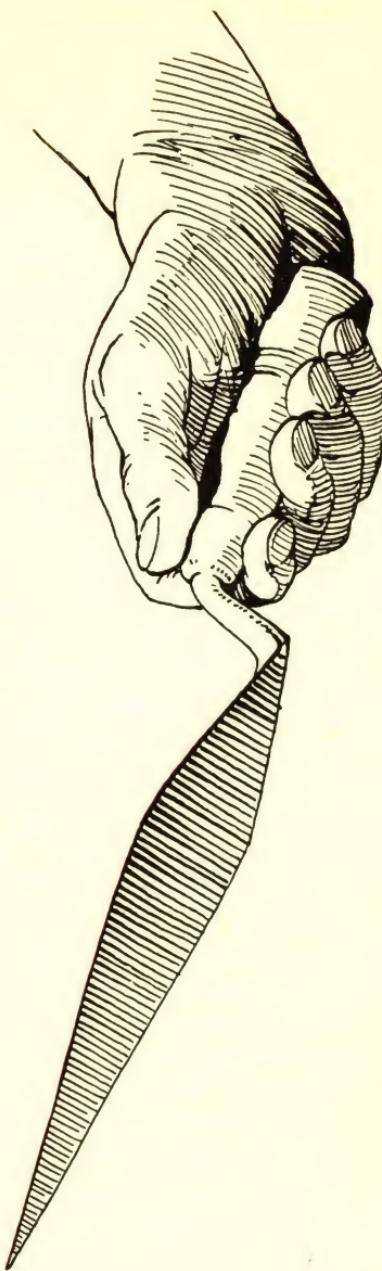


Fig. 6

including a line and lead bob attached to a shaped wooden rule. The plumb-rule is a piece of pine usually 4in. wide, from 4ft. 6in. to 6ft. in length, the thickness being about $\frac{1}{2}$ in. A centre line is marked on the face of the rule with a gauge, and extends the whole length of the rule. Care should be taken to ensure that the whole length of the rule is exactly the same width, and that the gauged line is exactly in the centre of it. This line is very important as the vertical position of the walls depends upon it.

The plumb-rule should be held by the left hand about nine inches down from the top at the left-hand side of the rule, with the thumb on the face of the rule and the four fingers at the back. Care should be taken to keep the thumb clear of the line which is attached to the plumb-rule. The left foot should also be placed against the outer edge of the rule about six inches up from the base in order to work in conjunction with the hand to procure a stable position of the rule against the face of the wall.

Fig. 8 is an illustration showing the *Straight-edge*. This is used for correcting the quoin bricks in relation to their vertical positions, at intervals, after they have been plumbed by the plumb-rule; it is also used for gauging the heights of the courses, and for levelling in small lengths. The illustration shows a plain rule, but sometimes such rules have a series of lines marked on the face to represent the gauge of the heights of the courses of brickwork. The straight-edge is usually 3ft. in length, made of a piece of well-seasoned pine, about 3in. in



Fig.
7

width and $\frac{3}{8}$ in. in thickness. It is sometimes divided by gauged lines into 3 in. divisions for the purpose of



Fig. 8

gauging the correct height of the courses. The straight-edge is usually held in the centre and placed with the inner edge against the face of the wall; it is held in the same position for gauging.

Fig. 9 is an illustration of a *Pair of Pins, and Line* attached. These are placed in the cross joints of the wall at each end, when the brick courses are being constructed, and the line which is attached is stretched between the pins in order that the course of bricks may be laid in a correct vertical and horizontal position to that line. The pins consist of shaped pieces



Fig. 9

of steel, with points at one end made flat (about $\frac{1}{8}$ th of an inch thick), which enables them to be inserted into a cross joint, the proper position being near the top of the joint. This brings the line, stretched between the two points,

one at each end of the wall, to the same horizontal level as the top edge of the brick. The line which is wound round one pin should be in the reverse direction to the winding round the other, so as to enable each pin to take a good tight strain and produce a tight line between the two points where the pins are inserted. The outer part of the pin consists of a thin neck of steel on which the line is placed, the end consisting of a round flat disc-shaped piece or head which prevents the line slipping off from the pin. The pins should be placed firmly into the top part of each

of the cross joints with a firm push; when the line is stretched they will then remain stable.

Fig. 10. This is an illustration showing the *Club Hammer*, which usually consists of an ash handle from 6in. to 9in. in length, with a shaped steel head, sometimes rectangular, or of the shape shown in the diagram with chamfered edges, etc. It is used, in conjunction with the steel chisels, for cutting away brickwork, also, in conjunction with the bolster, for cutting bricks. The weight of the head varies from 2 to 4 pounds. The way to hold the hammer is firmly to grasp the handle, a little from the end, with the thumb and two of the four fingers touching each other.



Fig. 10

Fig. 11 is an illustration showing the *Bolster*, which actually cuts the bricks after receiving smart blows from the club hammer, which is used with it. It consists of a piece of shaped steel with a semicircular shaped blade at one end, and a steel neck or handle ($\frac{3}{4}$ in. in diameter) at the other. The beginner should grip the handle as he does when using the club hammer.

Fig. 12 shows two illustrations of the steel *Chisels*, of different sizes. As already explained they are used in conjunction with the club hammer for cutting away brickwork. They are, of course, long steel bars of various sectional shapes (round, rectangular, or octagonal) and varying also in length. These are usually gripped firmly just above the centre in the same way as a club hammer, but with the left hand.



Fig. 11



Fig. 12

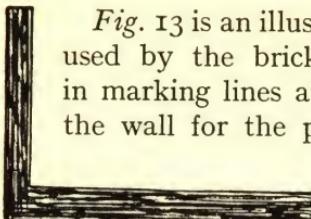


Fig. 13

Fig. 13 is an illustration of the *Square* sometimes used by the bricklayer in squaring bricks and in marking lines at right angles from the face of the wall for the position of openings, etc. It is made of steel, 12in. on the long side and 9in. on the short side; it is usually about 1½in. to 2in. in width, and ½in.

or more in thickness. The long side is sometimes marked with lines, and divided into inch divisions for the purpose of taking various measurements. This is held in a firm position against a pencil or trowel when marking various marks with either.

Fig. 14 is an illustration of a *Bevel*. This is used for defining various angles, etc. It consists mainly of two parts: the handle, which is called the stock, and a steel blade, which works on a pivot screw arrangement in the handle; this blade can be moved to various angles, and then screwed tight to a rigid position in order to retain firmly the angle required.

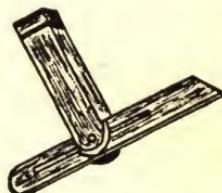


Fig. 14

Fig. 15 is an illustration showing the *Hawk*. This is a small square board, about 9in. × 9in. and ½in. in thickness, made of pine; the handle below is about ¾in. in diameter. The hawk is made for the purpose of holding a small quantity of material for pointing brickwork joints. It is used



Fig. 15

in conjunction with the *Pointing Trowel*, *Frenchman*, and *Pointing Rule* as shown in illustration (*Figs. 15A, 15B, and 15C*). The pointing trowel is a similar tool to

the brick trowel already explained, but of a much smaller size. It is used, in conjunction with the hawk, for placing material into the joints of brickwork and



Fig. 15a



Fig. 15b

obtaining various finishes. After this process the frenchman and pointing rule are brought into action, the rule being held against the bottom of the horizontal bed joint which has just been made, and, by drawing the frenchman along the bottom of the joint, the surplus material of the joint is cut away, leaving a parallel finished joint; the frenchman is guided along the bottom of the joint in the brickwork with the aid of the top edge of the pointing rule, along which it travels. The frenchman, as it is known in the trade, is really an old knife, shaped to a point and turned up at that end to enable it to cut and remove the surplus material of the joint as it slides along the top edge of rule.

Fig. 16 is an illustration of the *Spirit-level*.
This is used for obtaining horizontal levels; it
consists of a case of mahogany or ebony about 6in. to
9in. in length; in the centre recess is inserted or bedded

Fig.
15c

Fig. 16

a cat's-eye tube (usually containing spirits of wine) which forms the levelling apparatus. The whole of the top of the level is covered by a brass plate in order to protect the glass tube; some levels have

a sliding shutter which is closed over the tube when not in use.



Fig. 16a

Fig. 16a is an illustration of a plumb-rule which can be used as an ordinary plumb-rule with the aid of the ordinary line and lead bob, and also for plumbing vertical positions with the aid of the small inserted level which you see on the left-hand side near the top of the plumb-rule. It can also be used for horizontal levelling with the aid of the level which you see in the centre. It is sometimes made of pine or mahogany, with a central recess, as shown, for the purpose of obtaining a tight grip when levelling. The tubes are generally protected with brass plates, as in the case of the small hand-level.

Fig. 17. This illustration shows the *Two-foot Rule*, which is made to close to a 6in. length so as to be very convenient for the

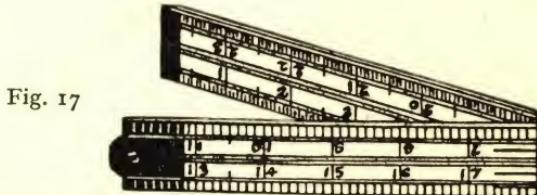


Fig. 17

pocket. It is usually divided into inches, half inches, etc., and numbered, and is used by the bricklayer for taking various measurements. It is made principally of box-wood and protected with brass bands, etc., on the ends.

Fig. 18 is an illustration of the *Brick Hammer*, which consists of an ash handle about 9in. or 10in. in length, with a shaped steel head, which is squared at one end,

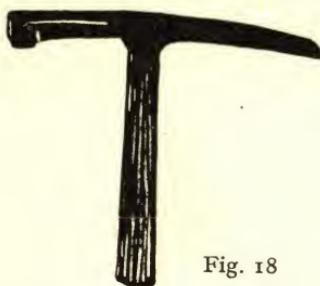


Fig. 18

for striking nails, etc., and at the other end it is chisel-shaped for the purpose of cutting bricks, etc. It is usually gripped in the same way as the club hammer.

Fig. 19 shows the illustration of the *Scutch*, which is used for cutting and finishing various shapes to bricks.

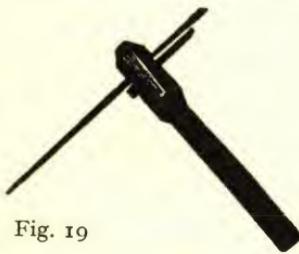


Fig. 19

It consists of a combination of three parts: the stock, wedge, and blade. The stock is usually made of ash, and shaped into the form of a handle and head; the head contains a slot into which the blade is inserted, usually at the angle of about 30 degrees, and is held firm in that position by means of the wooden wedge. The scutch is held in a similar manner to the brick hammer, with the exception that the thumb is in a

position on the handle or head (which is preferred) in order to guide the rule.

Fig. 20. This is an illustration showing the lead *Plumb-bob*, which as you will see is a pear-shaped piece of lead that is attached to a string and swings in and out of the shaped hole at the base of the plumb-rule.



Fig. 20



CHAPTER IV

THE BONDING OF BRICKWORK

SIMPLE RULES AND THEIR APPLICATION

THE WORD "Bond" in its relation to brickwork means the method which is adopted in various arrangements of bricks, and these various arrangements are known by certain names. The two bonds which are mostly adopted and universally used are known as English and Flemish bond. English bond consists of one course of stretchers and one course of headers alternately. An illustration of English bond is shown in *Fig. 21*;

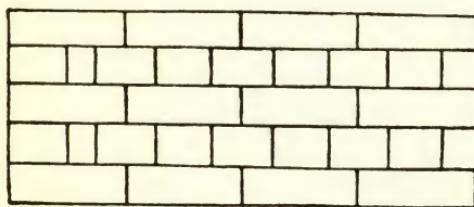


Fig. 21

this is an elevation showing five courses. Flemish bond consists of stretchers and headers alternately in each course. *Fig. 22* is an elevation showing five courses.

The "bonding" of brickwork means the actual placing of the bricks in their proper places in order to form the correct arrangements, which should, when

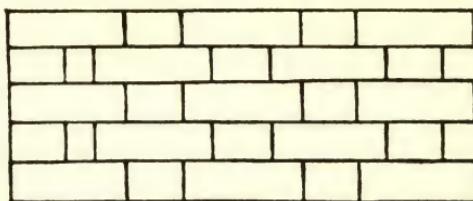


Fig. 22

completed, distribute the weight equally over the foundations.

In the practical application of bonding the beginner should learn and memorise a few simple rules in relation to bonding the bricks. These he can apply to the various examples in the book, and when he meets other examples which he will probably come in contact with during his daily occupation.

First, the English and Flemish bond arrangements should be learnt and thoroughly memorised.

Second, the vertical line in the centre of the header should be in the same vertical line as the centres of the stretcher in the course below and above it. To illustrate this rule I have shown an isometric drawing (Fig. 23) which consists of three courses, marked, 1, 2, and 3. In the centre course, No. 2, you will notice that the centres of the headers, which are marked black, are in the same centre vertical line that runs through the centres of the stretchers in the course above and below. These vertical centre lines I have marked 4, 5, 6, and 7, so as to make it quite clear.

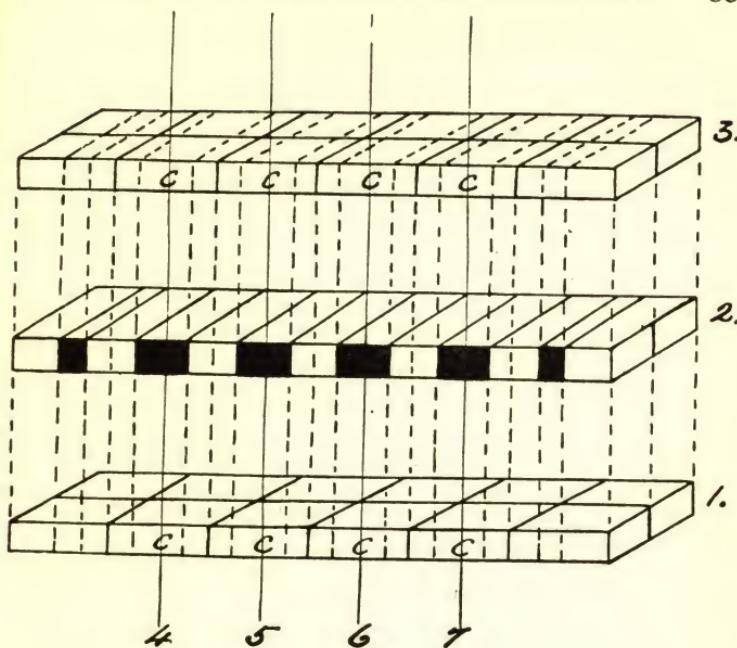


Fig. 23

Fig. 24 is an illustration showing the isometric view of a 13½ in. quoin, with three footing or foundation courses, as they are sometimes called. We will first start with the footing courses and explain *Rule 3*, which states that all footing courses should be laid with headers as far as possible. You will see that all the footing courses show header faces in the isometric drawing, with the exception of the quoin bricks, which show a header on one side of the angle point and a stretcher on the other, and also of the three-quarters, which are inserted in each course to obtain the correct bonding of the footing courses. On the left of the drawing is a section showing the three footing courses,

CB

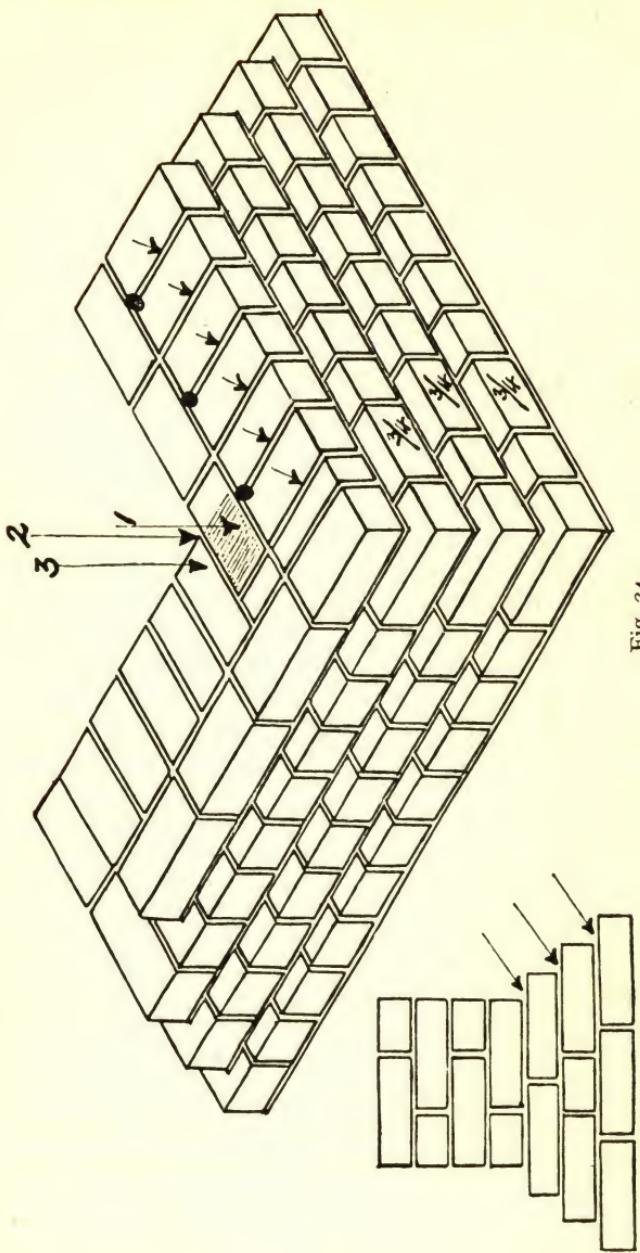


Fig. 24

in which this rule can be more plainly seen. The first course of footings contains three rows of headers. The second course, being an odd half brick in thickness in the width of the course, shows two rows of outside headers and one central course of stretchers. Looking at the section of this second course of footings, the centre stretcher brick shows as a half brick, this being the end of the stretcher. The third course of footings in the section shows two rows of headers. Thus you will quite understand what is meant by saying the footings should be laid as header courses as far as possible.

Rule 4 states that the first or bottom course of footings should be twice the width of the wall. In the section you can see the illustration of this rule by first looking at the width of the wall, which is one and a half bricks in width, and then at the bottom course of the footings, which is three bricks wide, that is, just twice the thickness of the wall. The same rule applies to all walls, of various thicknesses; but in the case of walls which are of a greater thickness than two bricks or more in width, then the bottom course of footings is doubled in thickness; this means that the bottom course of footings is still the same width, but, instead of placing one course, two are placed in position of the same width.

Rule 5 is that all footing courses should recede in regular offsets of $2\frac{1}{4}$ in. from the face of the preceding course of footings. The three offsets are shown in the section at the side of the isometric drawing, and are indicated by arrows.

Rule 6. All walls which are of an odd half brick in thickness (or width) should be tied in with a stretcher in the internal angle of the quoin. The meaning of an odd

half brick in thickness applies to a 13½in. wall, or a 1½-brick wall, as shown in section at the side of the isometric drawing. The same rule applies to a wall which is two and a half bricks in thickness, and so on. In the case of walls which are 18in. in thickness (two bricks) or 27in. in thickness (three bricks), this rule does not apply. The meaning of "tied in with a stretcher in the internal angle" is shown by the stretcher brick, marked with a vertical arrow No. 1, in the internal angle of the quoin. When the stretcher, as in this case, proceeds or passes beyond the angle point of the internal angle into the wall itself, the brick is said to be tied into the wall. The portion of the stretcher which proceeds beyond the angle point I have marked with shaded lines; this is the portion that is tied into the wall. The angle point is marked with arrow No. 2. The header is against the internal angle point, and does not actually tie into the wall; this is marked with arrow No. 3.

Rule 7. All transverse joints should continue unbroken across the width of the wall, except when stopped by the centre of a stretcher. Transverse joints are those which run at right angles to the face of the wall. The joints which I have marked with small arrows, on the top course of the isometric drawing, are transverse joints, and you will plainly see that they proceed across the whole width of the wall, at right angles to the face, with the exception of the joints which are stopped by the centres of the stretchers; these I have marked with black dots to indicate the stopping position. This rule should be carried out in order to produce the correct sectional bond in the thickness of the wall.

Fig. 25. This is an isometric drawing of two courses

of brickwork showing the incorrect method, which would produce, as you will see in the second course, a series of straight internal joints in the wall (I have marked these with thick lines), causing a great weakness at these particular points. I have projected the headers

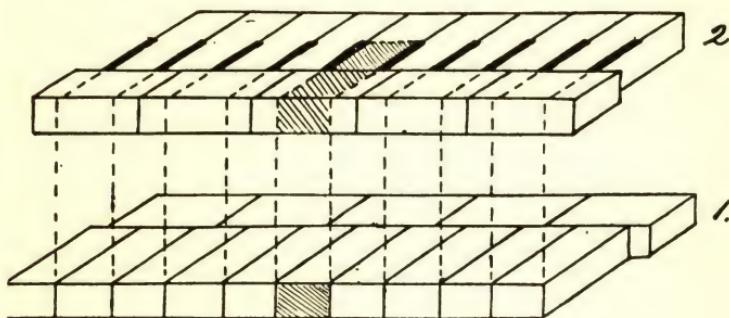


Fig. 25

in the first course up to the centres of the face stretchers of the second course, and continued the dotted lines to the beginning of the straight joints in the wall. The beginner should now understand the meaning of Rule 7. Of course all the face perpends, or cross joints, should be kept in vertical positions with each other.

CHAPTER V

THE BONDING OF STRAIGHT SHORT LENGTHS OF WALL

THE BEGINNER should thoroughly study the lengths of short wall as shown from *Fig. 26* to *Fig. 33*, which include walls with stop ends starting with one-brick walls, showing two courses of each, in English and Flemish bond, and walls of one and a half, two, and two and a half bricks in thickness, also in English and Flemish, showing two courses of each in both cases. You will observe that in most cases the closer is worked next to the header quoin; this is inserted in order to obtain the correct bond throughout the length of the wall. The rules of bonding should be observed in each case of bonding, and when the beginner has given enough study to these examples, and has memorised them, he should put the book on one side and procure some graph-lined paper; upon this he should practise the various examples in freehand, memorising the rules as he draws the examples, which can be drawn to brick size, taking the small squares on the paper to represent 1 in. to each square. By this method he should be able, after a while, to produce the correct proportions of the various bricks, the correct bond in each example, and also obtain the ground work in bonding walls.

Fig. 26 is an illustration showing the plans of two courses of a 1-brick wall in English bond.

Fig. 27: Two courses of a $1\frac{1}{2}$ -brick wall in English bond.

Fig. 28: Two courses of a 2-brick wall in English bond.

Fig. 29: Two courses of a $2\frac{1}{2}$ -brick wall in English bond.

Fig. 30: Two courses of a 1-brick wall in Flemish bond.

Fig. 31: Two courses of a $1\frac{1}{2}$ -brick wall in Flemish bond.

Fig. 32: Two courses of a 2-brick wall in Flemish bond.

Fig. 33: Two courses of a $2\frac{1}{2}$ -brick wall in Flemish bond.

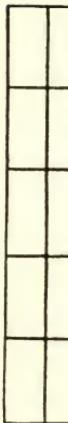
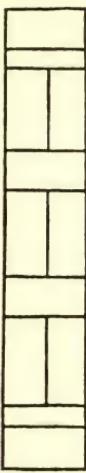


Fig. 26

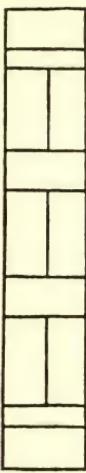


Fig. 27

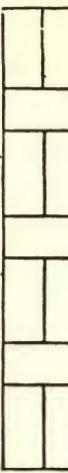


Fig. 28

Fig. 28

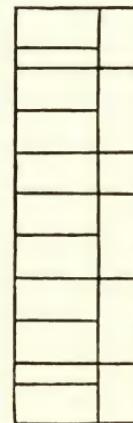
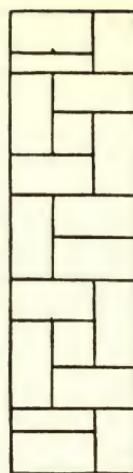


Fig. 29

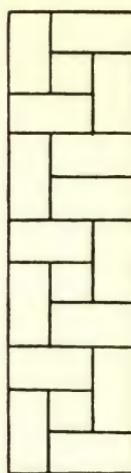


Fig. 30

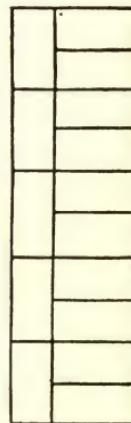


Fig. 30

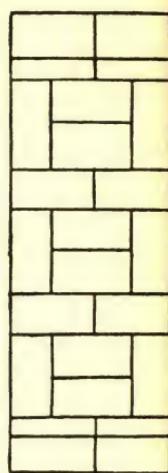


Fig. 31

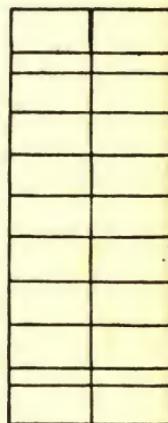


Fig. 31

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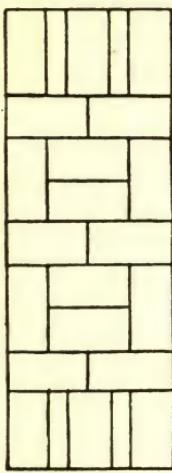


Fig. 32

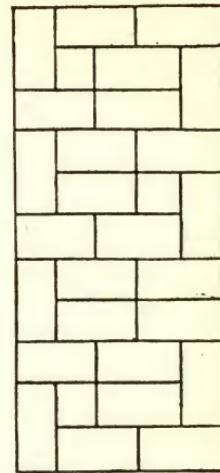
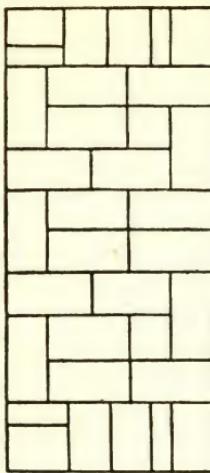


Fig. 33

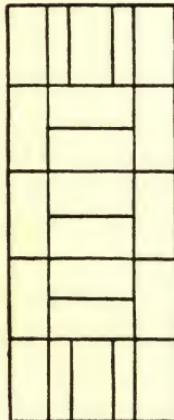


Fig. 28

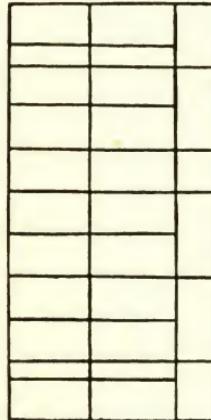


Fig. 29

CHAPTER VI

A NEW AND EASY METHOD OF LEARNING THE VARIOUS BONDS

THE METHOD is shown on two sheets, which you will see on pp. 44-7. The lower sheet consists of a black and white arrangement of the bricks and joints, the bricks being black and all the joints white; upon this is placed another sheet, consisting of tracing paper, which is transparent, and the alternate course is drawn on this paper over the other black and white course. By this method both the courses can be seen at once, and it is much easier for the student to see the various positions of the second course of bricks over the first course than by drawing them separately by the ordinary method. I have given a sample set showing two elevations and two sections, three quoins in English and Flemish, and footing courses. The student or beginner can easily make a set for himself by first constructing the lower sheet and blacking the bricks with a good soft blacklead pencil and leaving the joints white (any bonds can be drawn like this), and then placing the tracing paper over them. It will then be found that by this method he will be able to trace the top or second course on the tracing paper very easily, especially as he can see the positions of the bricks and joints in the

course below, which give him a good guide. Whilst so doing he should remember the simple rules of bonding, and should then be able to work out many examples of bonding as used in general bricklaying. Further, having the black and white course under his eyes, he will be able to avoid straight joints and internal incorrect bond. In this way he will soon acquire the principles of bonding. A student sometimes gets confused when drawing the two courses of bonding separately, especially if they are not drawn vertically under one another. This easy method of learning the bond will prove very useful to the beginner.

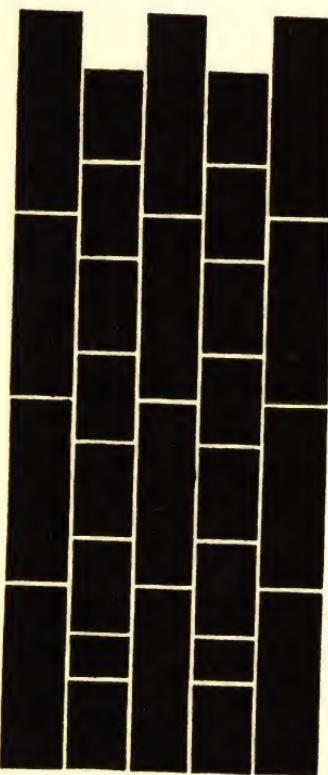


Fig. 34

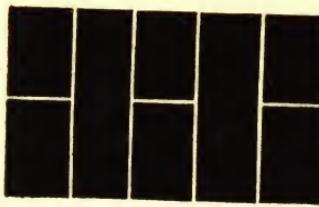


Fig. 36

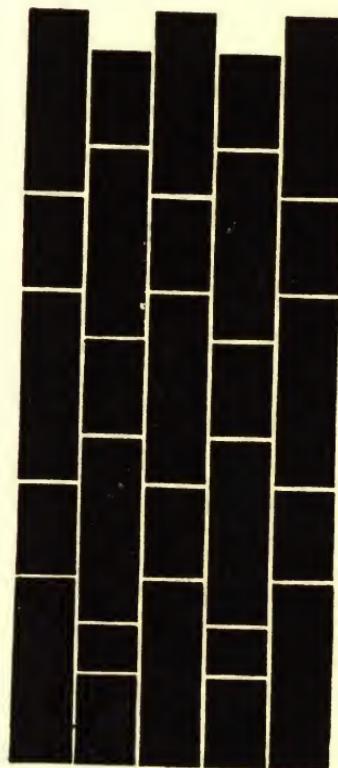


Fig. 35

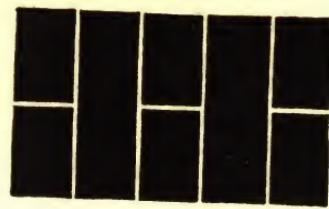


Fig. 37



Fig. 38

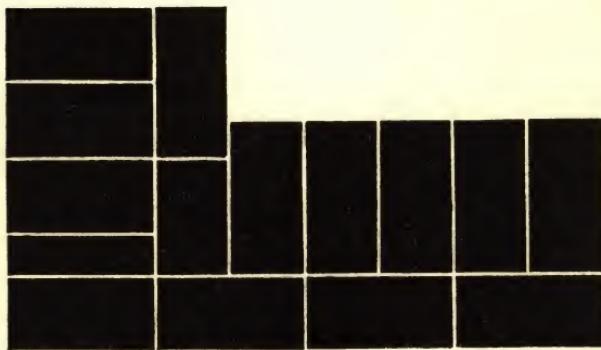


Fig. 39

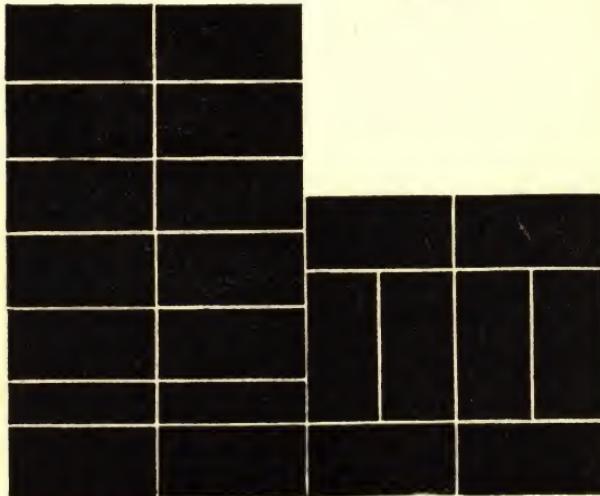


Fig. 40

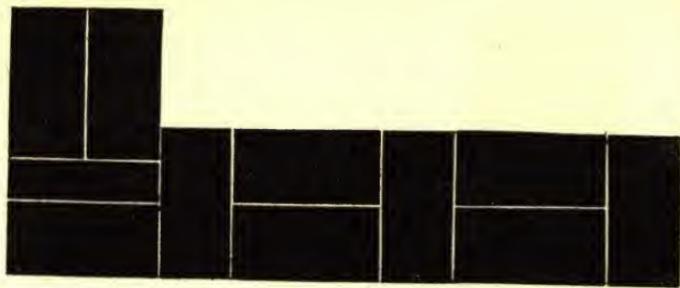


Fig. 41

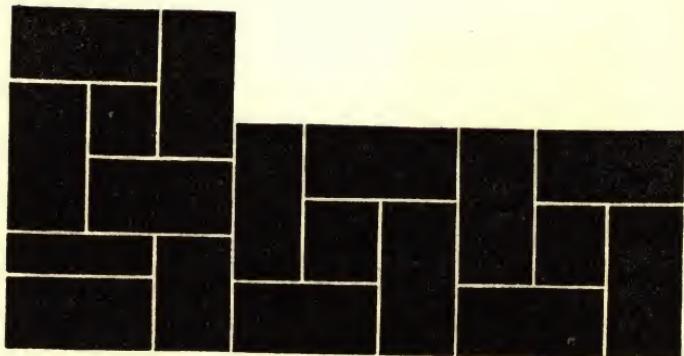


Fig. 42

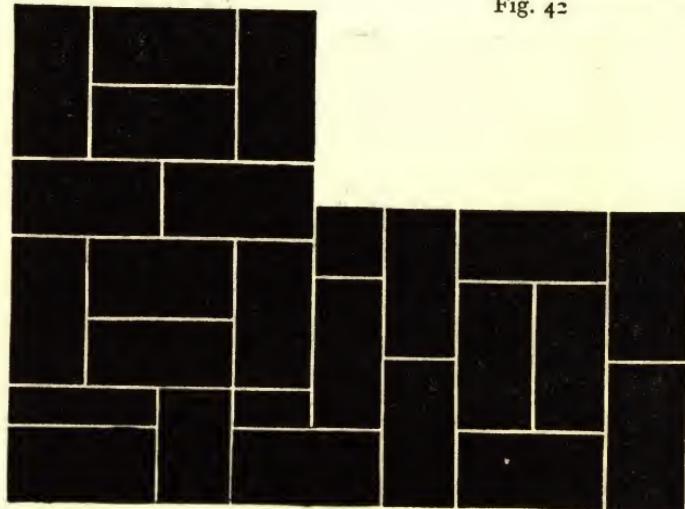


Fig. 43

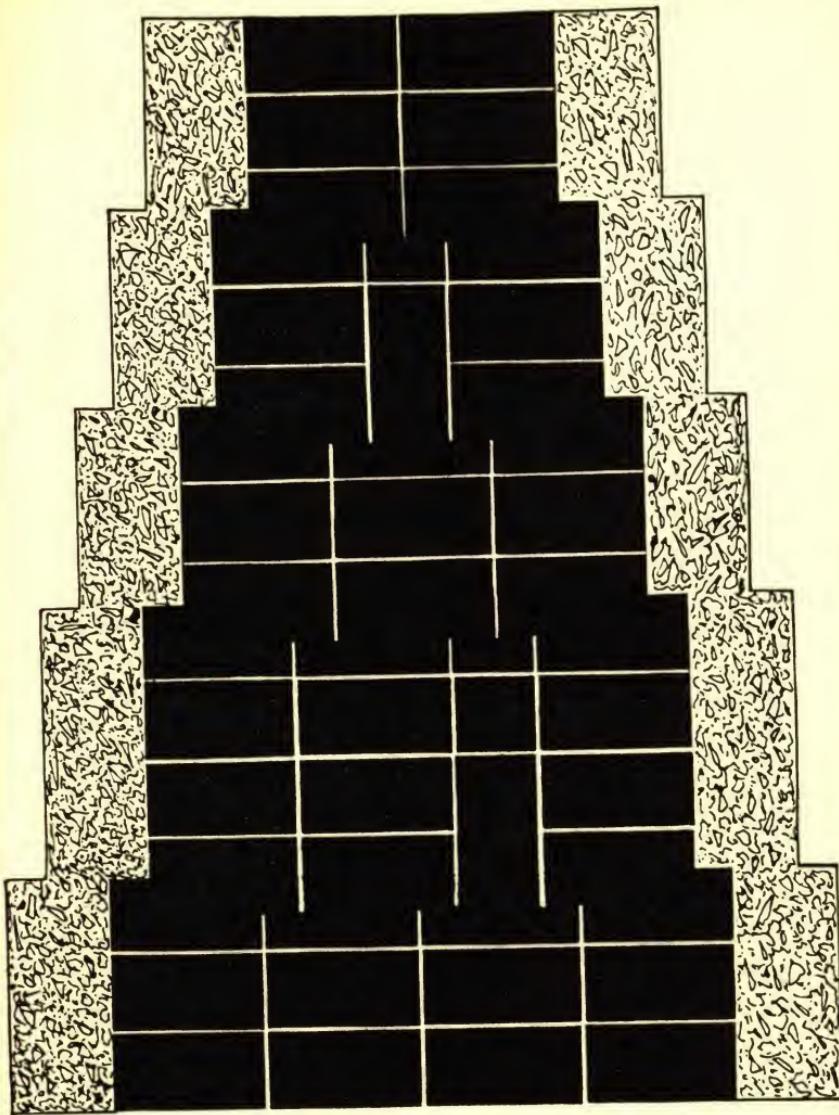


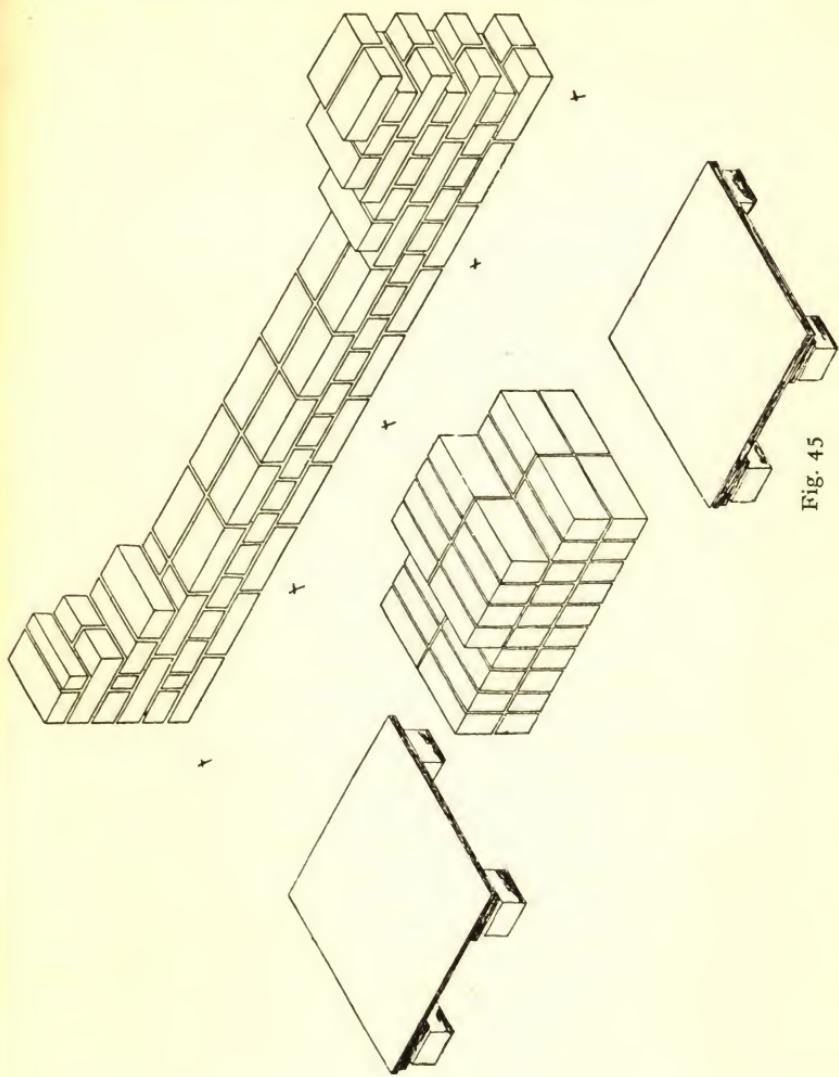
Fig. 44

CHAPTER VII

PROPER POSITION OF THE BEGINNER IN RELATION TO THE WALL, MORTAR- BOARD, AND BRICKS

FIG. 45 is an illustration showing the proper lay-out of the positions for the beginner. The mortar-board and bricks are placed conveniently in relation to the position of the wall.

It is a most important matter that the mortar-board and bricks should be placed correctly and the whole of the lay-out kept tidy in order to ensure proper working facilities for the bricklayer or beginner. A number of important points should be observed. First, the mortar-board should be placed in a position that will allow a clear space of about 2ft. being kept between the face of the wall and the inner edge of the mortar-board, permitting freedom of action for the bricklayer to enable him to take his mortar from the board and place it on the wall. The mortar-board should be raised above the level of the existing ground or scaffold about $4\frac{1}{2}$ in. To do this it is usual to place four bricks underneath the board, one at each corner; this prevents the bricklayer from injuring his hand on the ground, as sometimes happens when taking the mortar from



the board if it is close to the ground. The mortar-board should not be overloaded, as this prevents the bricklayer taking the mortar from the board in the proper way; otherwise a portion is sometimes dropped round the board, making it look very untidy. The mortar should be kept in a neat heap and trimmed up occasionally.

The bricks, as shown in the illustration, should be stacked neatly and be in the same line as the mortar-boards. It is much easier for the bricklayer to take his bricks from a neat stack than it is for him to sort them out from a heap in which they have been thrown at random on to the scaffold. Besides, if they are placed in a neat stack, the majority of them at any rate will be in a sound condition and can be used at once; on the other hand, if they have been thrown down in a heap, probably a good proportion of them will be either chipped or broken, and it will take the bricklayer a considerable time to obtain the good bricks out of the heap. Carelessness often proves costly, whilst method and tidiness certainly pay.

Very often accidents are caused by untidy scaffolds in regard to bricks and mortar. Small pieces of brick littered about in the vicinity of the wall where the bricklayer is working have often been the cause of a sprained ankle or fall, due to carelessness in not clearing the pieces away. Again, mortar littered about the scaffold is very dangerous, especially in wet weather, when it becomes very slippery and may be the cause of an accident; moreover it may be the means of disfiguring the faces of the walls, as the wet mortar splashes against those faces. I have mentioned these few points in relation to the lay-out in order to show

that it is important for the bricklayer's surroundings to be kept neat and tidy, so that he can produce good examples of craftsmanship.

The positions of the beginner as he moves along the face of the wall are shown by crosses.



CHAPTER VIII

THE PRACTICAL USE OF THE TOOLS

HAVING EXPLAINED the brick and its various parts, the names, uses, construction, and handling of the tools, the correct methods of placing the bricks, the proper lay-out of the mortar-boards and the bricks, and the beginner's relationship to them and the wall to be built, etc., we now come to a very important stage: that is, constructing the walls and bringing the tools into practical use. The method of holding the trowel has been described; the trowel is the most important tool the bricklayer has to use, and so we will start to explain its use in actual everyday practice, assuming that the mortar-boards are full of mortar, and that the bricks are placed in their correct positions on the ground or scaffold, and the bricklayer is about to lay a few bricks on the wall already existing.

The trowel being held correctly, the first procedure is to pick up a brick in the right manner and hold it correctly. *Fig. 46* is an illustration showing the correct way of picking up a brick and holding it. As you will notice, it is firmly gripped by the hand, the four fingers showing at the back face of the brick, whilst the thumb is on the front face of it, and the palm of the hand on the top, the bed of the brick facing downwards. The

brick is actually held in the centre, and part of the frog is seen. After having mastered the method of holding the brick trowel and the brick, the next important thing to learn is to be able to take the mortar

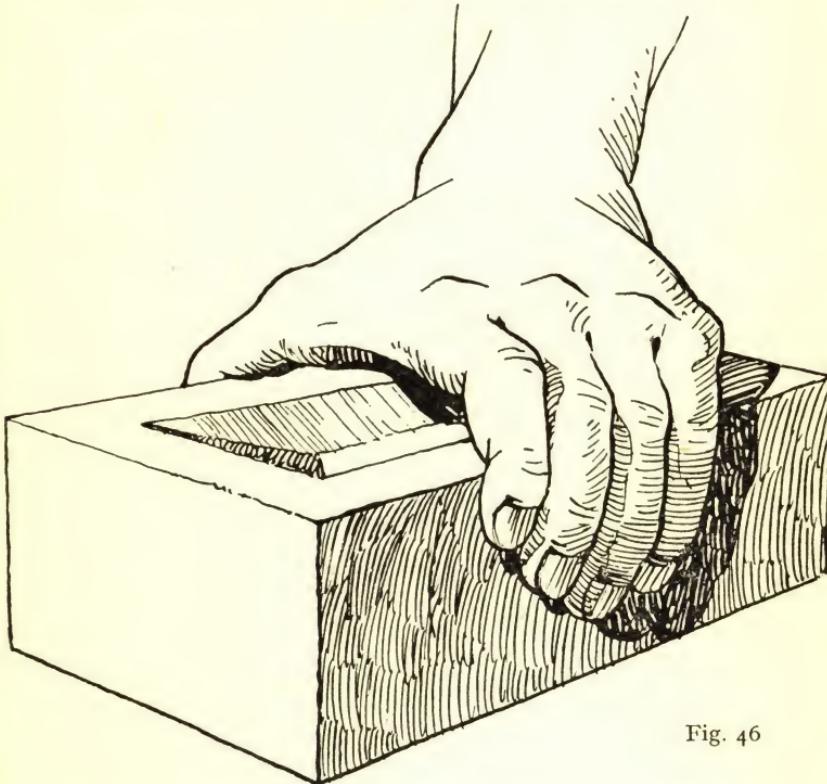


Fig. 46

from the board in the correct way. *Fig. 47* is an illustration showing the correct method of taking mortar from the mortar-board. As you will see, in this case the blade of the trowel is held at right angles to the face of the board, with its point slightly inclined to the front edge

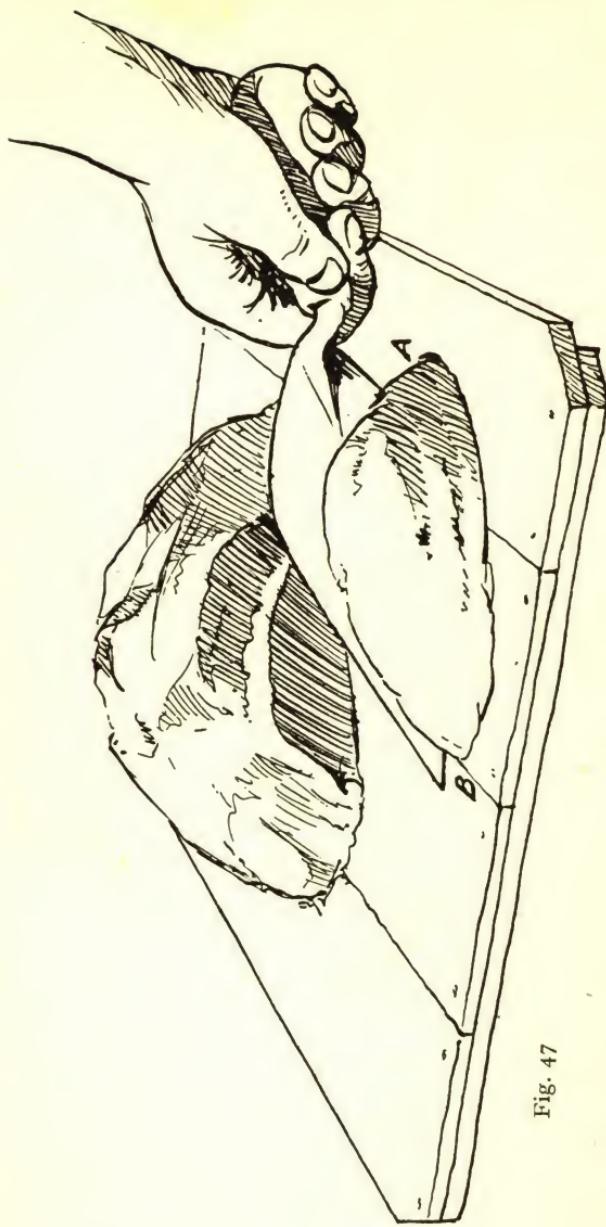


Fig. 47

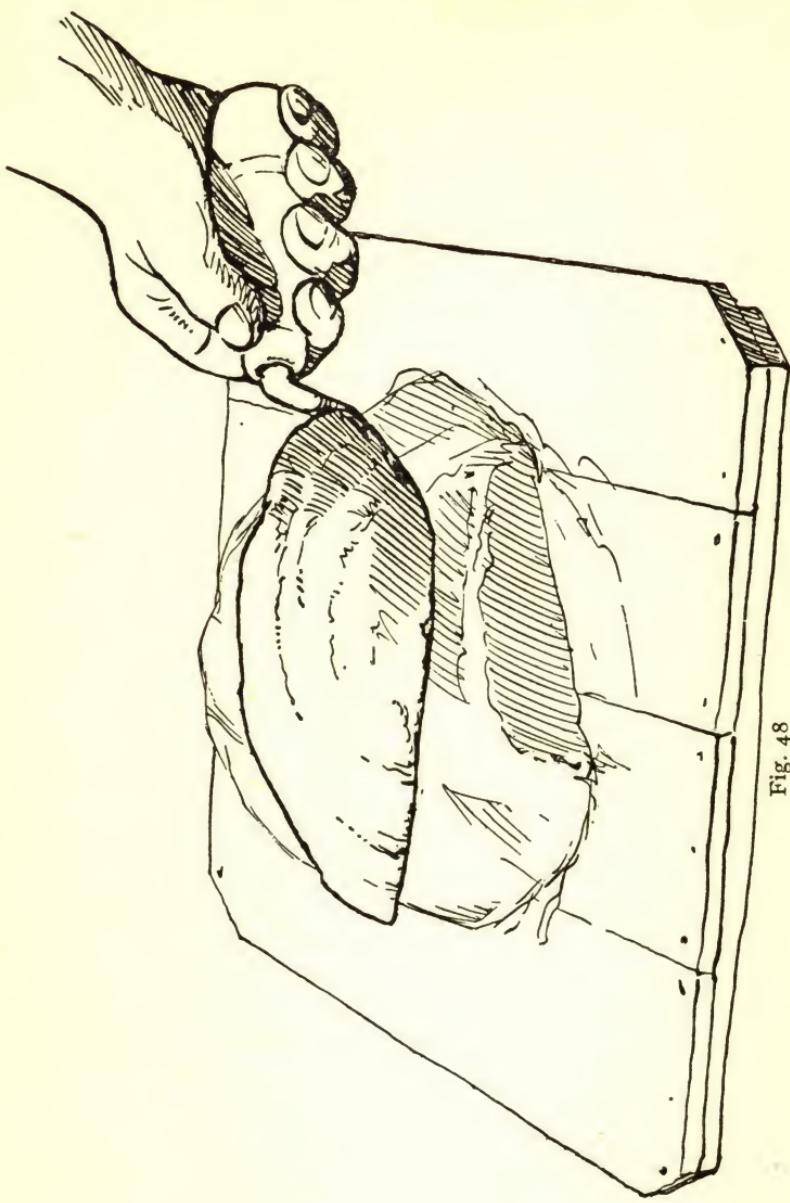


Fig. 48

of the board. The bricklayer has previously placed his trowel sideways in the heap of mortar, and has drawn this portion down to the front of the mortar-board. After he has done this he presses the side of the trowel (the blade still held at right angles to the board) by a backward and forward movement against the side of the portion he has drawn down from the heap in order to make a neat pat; he then places the blade of his trowel in a flat position on the board, the side of it being against the portion taken; he then pushes it smartly under the small heap he has taken in the direction of the front edge of the board from point A to B as shown. This enables him to collect sufficient mortar on his trowel with which to lay the brick. These actions need plenty of practice before the beginner can accomplish them in the correct way.

The next illustration (*Fig. 48*) shows a trowel full of mortar which has been lifted up from the board; you will see that by taking the mortar from the board in the correct manner, and by taking only just the sufficient quantity as shown, one is able to keep the mortar on the board in a tidy condition. Of course, at intervals the mortar on the board needs a trim up.

The next procedure is in practice one of the most important points connected with the laying of bricks, and that is the correct way to lay the bed of mortar. *Fig. 49* and *Fig. 50* show two movements which are required in order to ensure a level bed of mortar, which should also be laid solidly and be uniform in thickness throughout its length. In both these illustrations you will see that the mortar has been laid on the wall, and is being spread in order to obtain a level bed. *Fig. 49* represents the forward movement of the trowel, in

which the edge of the blade is held at an inclined angle against the mortar, spreading it evenly as it proceeds along the length of the bed. *Fig. 50* represents the

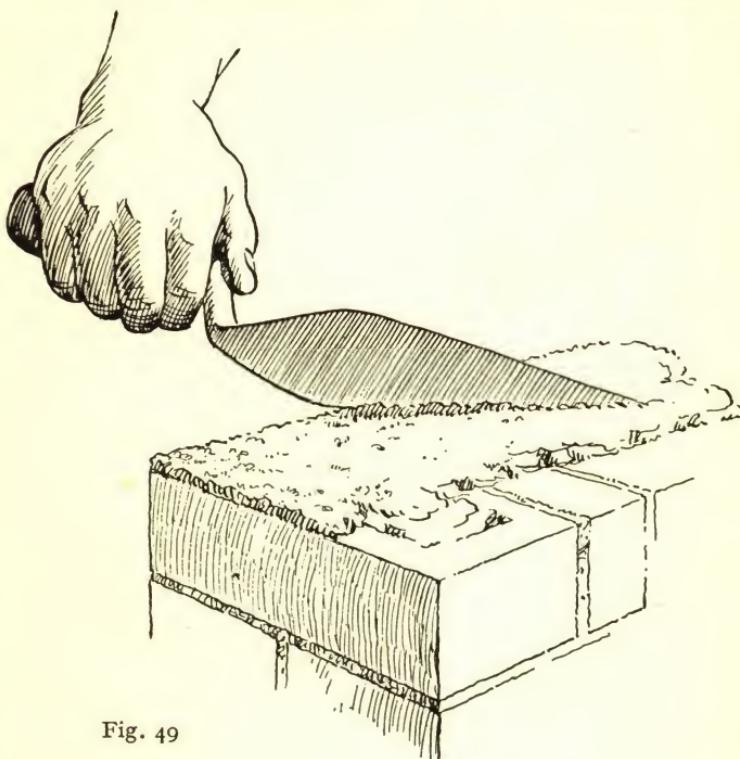


Fig. 49

reverse or backward movement, in which the bricklayer draws the trowel towards him; in the first or forward movement the bricklayer pushes the bed in the reverse direction. Of course, these movements are made many times until a level and solid bed is obtained; it needs a considerable amount of practice before one is absolutely

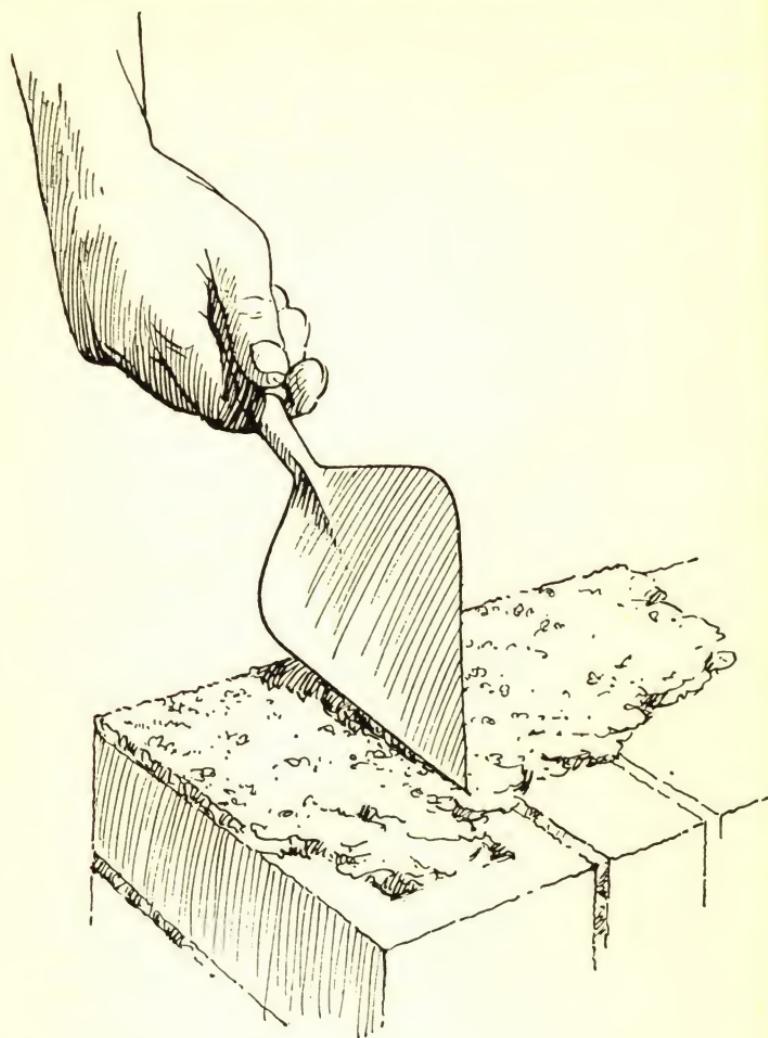


Fig. 50

proficient. In both these cases the bed for the stretcher brick is being spread. These trowel movements are directed by working the wrist and forearm, and not direct from the shoulder. The thumb plays a great part in the guidance of the movements of the trowel. The beginner, when spreading the mortar bed, should hold the trowel at a certain angle, in both the backward and forward movements; he will with practice soon become skilful in the laying of the correct bed of mortar.

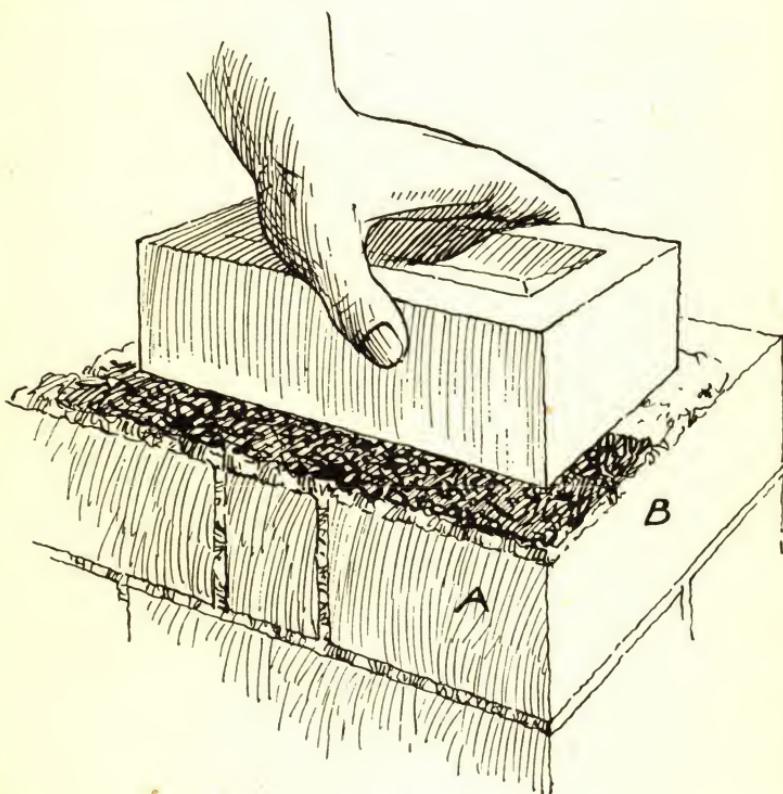


Fig. 51

To provide such a bed is an essential factor in the laying of every brick.

Fig. 51 is an illustration showing the actual brick just being laid on the corner. The position of the bricklayer is a very important factor in this case; he must stand close to the wall, and his head should be well over the brick he is about to lay, in order that he can see the vertical surfaces of the quoin, near the angle—these, as you will see, I have marked A and B. The brick should be held in a firm position and pressed down on the bed evenly, with the palm of the hand, care being taken to ensure that the two faces of the brick which is just being laid are exactly vertical with the faces of the existing quoin bricks below. By constant practice the bricklayer who stands well over his work can look down each of the vertical faces of the quoin, and make practically certain of this important point. The brick is almost in its final position, except for being tested by the plumb-rule.

When the brick was pressed into its correct position a certain amount of the bed was pressed out beyond the face of the wall; this has to be removed by the brick trowel to leave a proper finish. *Fig. 52* is an illustration showing the brick which has just been placed in its final position, and a certain amount of mortar projecting on the face of the joint, caused by pressure of the hand in obtaining that position. The trowel is held against the wall in the position shown and pushed forward along the face of the joint; the material in this way is pushed on the trowel, and then placed back on the mortar-board. It is very important that the trowel should be held practically at right angles to the face of the wall. This will enable the surplus

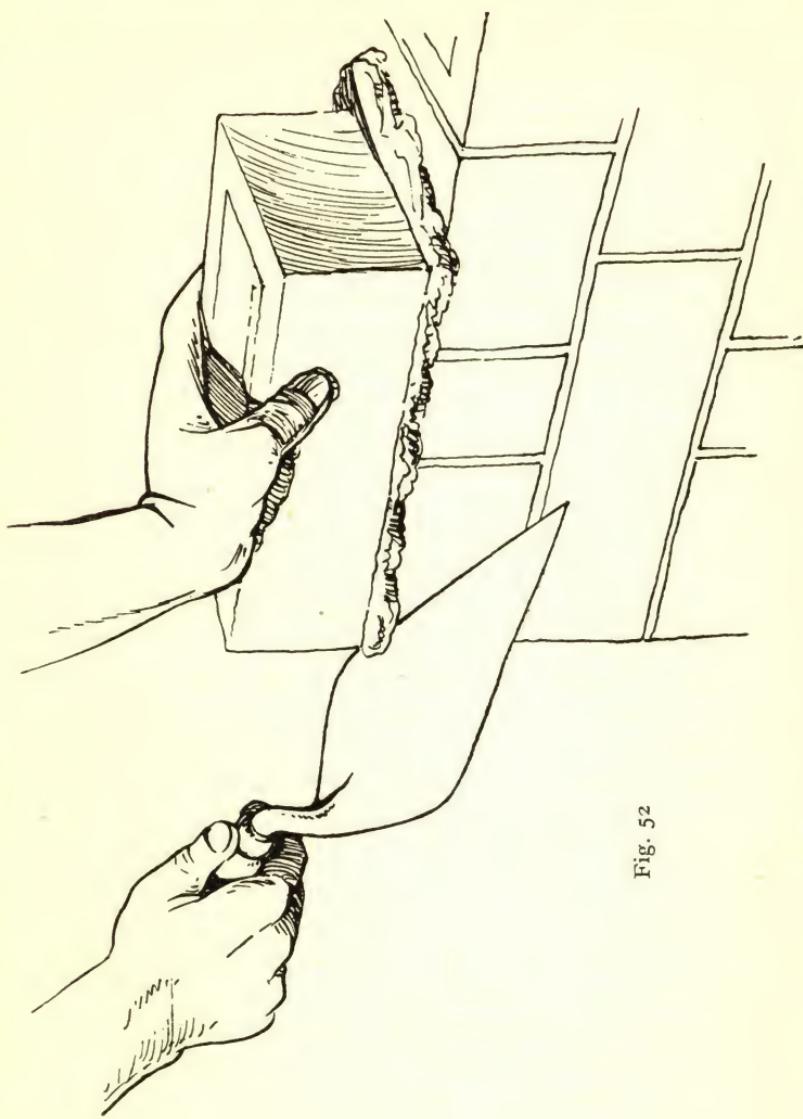


Fig. 52

mortar of the joint to be cut off cleanly, and not to disfigure the faces of the bricks above or below it. If the surplus mortar is taken from the face of the joint with the trowel laying in a flat position against it, it is certain that the face of the brickwork will be smeared by the mortar rubbing against it. For removing the surplus mortar which projects from the face of the return joint, the trowel should be turned round in the direction of the return face of the wall, and still held at practically right angles to the return face, and the same action applied to remove the mortar.

Another very important joint is the cross joint, which is the material that forms the vertical joint between two bricks. A small portion of mortar should be taken from the mortar-board on to the trowel. The bricklayer, in making the joint at the end of the brick, should hold the blade of the trowel almost at right angles with the bed of the brick, and at an angle of 45 degrees to the vertical end of the brick; the material which is now on the blade of the trowel should be pressed by the workman, with a movement towards himself, against the vertical end of the brick, making an angular-shaped joint; again, this should be pressed against the vertical end of the brick with the inside of the blade of the trowel, thus making a compact parallel vertical joint against the end of the brick, to which another brick can be placed.

Fig. 53 is an illustration showing the actual plumbing application to a quoin by the aid of the plumb-rule; the correct handling of this tool has already been described, and here we see the hand and foot of the bricklayer in their correct positions, holding the plumb-rule against the quoin. The first position in the

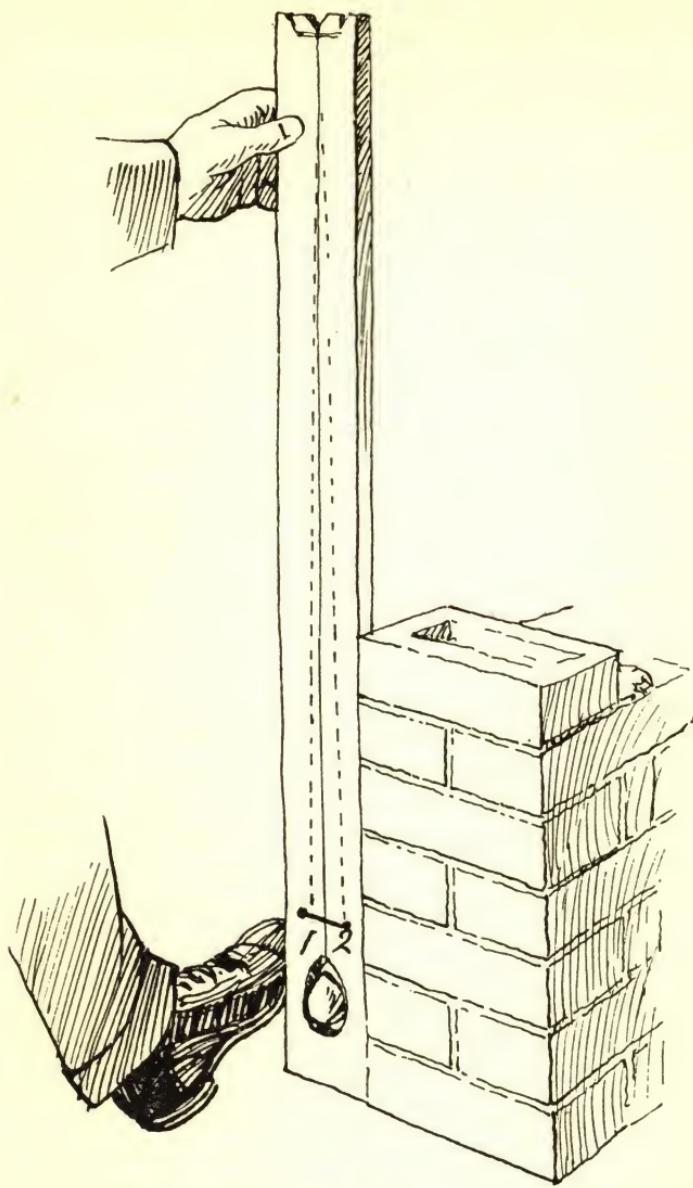


Fig. 53

practical application of the plumb-rule is to place it about 1 in. from the quoin angle against the face of the brickwork. The top part of the plumb-rule should be inclined forward from where the bricklayer stands; this action causes the lead bob to remain still. The plumb-rule should then be drawn forward gently towards the face of the bricklayer; this action causes the lead bob to swing gently forward and backward against the gauged line in the centre of the face of the plumb-rule. The bob and line attached should swing exactly at right angles to the face of the plumb-rule, touching the line on the plumb-rule at each movement. The face of the quoin bricks are then in a correct vertical position. Care should be taken to see that the lead bob does not touch the base of the shaped hole in the plumb-rule, which would retard the swinging action. This can be secured by tightening the line and refixing the string at the top of the plumb-rule, to enable the lead bob to move freely in and out of the shaped hole. Just above the top of the shaped hole in the illustration you will see a line. This represents a piece of copper wire, called a guard or bridle, which is in the form of a curve from the face of the rule. The ends are inserted into small holes, and the wire is fastened securely at the back. A piece of line is sometimes used for a guard, but this does not last as long as copper wire. The guard prevents the line and bob from swinging right out of its place. The various swinging actions of the bob line should be carefully studied, as on this depends the vertical positions of the quoins and walls of a building. There are practically three positions in which the line of the plumb-rule swings. The correct position is the central swing of the line, which moves forward and

backward into the shaped hole of the plumb-rule at exactly right angles to the face of the plumb-rule, and touches the gauged line at each swing in order to check the correct vertical position. The two other positions in which the line swings are inside and outside of the centre gauged line on the face of the plumb-rule; these, of course, are both incorrect in relation to the vertical or upright position. The inside movement or swing of the line indicates that the face of the wall is in an inclined or *battering* position; the face of the wall is said to batter (a word used in the trade for this position). The dotted line No. 2 on the illustration shows this position and, when the line swings thus, the face of the wall is inclined, and should be corrected by slightly moving forward some of the bricks to the vertical position. The outside movement or swing of the line indicates that the face of the wall is inclined outwards, or *overhanging* as it is called (the trade word used for this position). The dotted line No. 1 on the illustration shows this position, and, in order to rectify this, some of the bricks should be tapped back on the face with the handle of the trowel, and the face of the wall checked again with the plumb-rule, until the vertical and correct central position is obtained. In order to become efficient in the handling and practical application of this important tool, a good deal of practice is required. The use of the plumb-rule should be carefully studied by the beginner, as this is one of the vital points in the construction of all classes of brick-work.

It will be as well now to explain one or two other practical applications of tools with which the brick-layer works. The hammer and chisels and also the bolster have been explained with regard to their proper

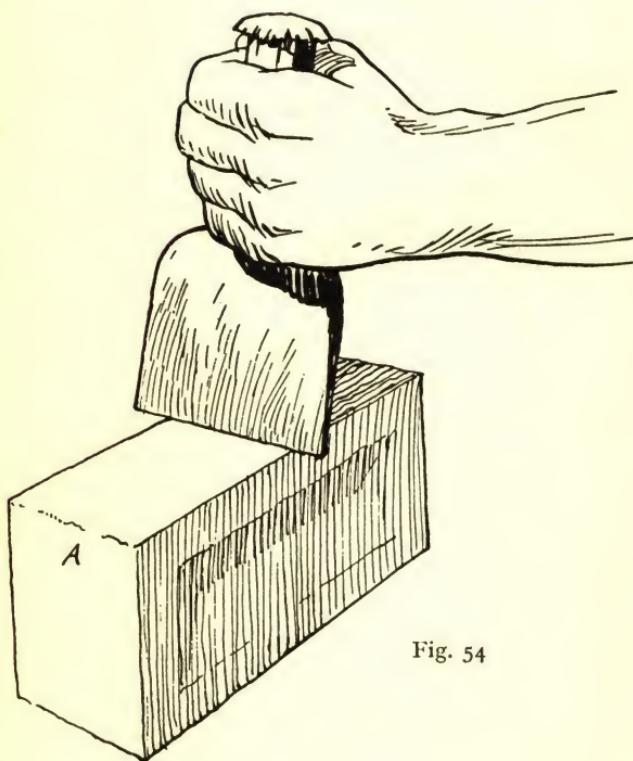


Fig. 54

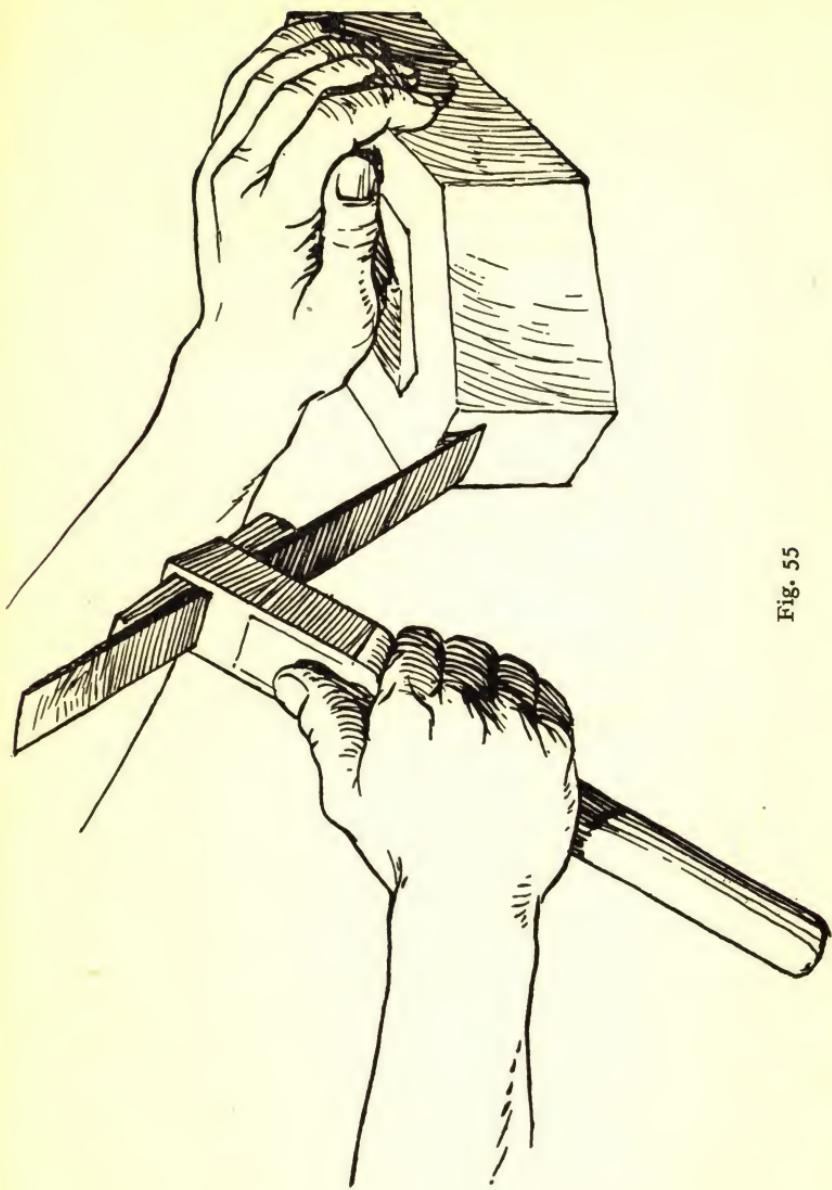


Fig. 55

handling. The illustration above (*Fig. 54*) shows the practical application of the hammer and bolster in relation to cutting the brick. The brick should first be marked on the face with a lead pencil to indicate the position of the cut, the bolster should then be held, as shown, by the left hand, and pressed firmly against the pencilled line on the face of the brick; then the head of the bolster should be struck firmly with the head of the hammer, which is held by the right hand. When the blow actually takes place the top of the bolster should be slightly inclined from the beginner towards the outer end of the brick, which I have marked A, this being the actual portion of the brick which is required. The bolster should be held firmly on the face of the brick, to keep it on the pencil line in a rigid position when it is struck by the hammer. If it is held in a loose way, the face of the bolster is liable to move past the pencil line on the brick when it receives the force of the hammer blow, and is likely to damage the face of the brick in the wrong place.

Chisels also should be held firmly in the same way as the bolster.

Fig. 55 is an illustration of a tool which is not so frequently used by the bricklayer; it is known as the scutch. The parts and handling have already been explained; here you will see it being held by the bricklayer in his right hand, the thumb resting on the head, which acts as a guide to the various strokes which he applies to the face of the brick. It is sometimes held a little lower down the handle; both positions are good, and it is a matter of preference whether you hold it lower down the handle or in the position as shown. Of course in the first place a brick of this kind, which is

called a squint, has to be marked at certain angles, then cut to a rough shape with the hammer and bolster, and eventually finished off at the various angle faces by the scutch. The left hand, as shown, is placed on the top of the squint brick in order to steady it while it is being shaped on the face with the blade of the scutch. The blows from the scutch should be well directed and care should be taken not to injure the external angles of the squint. When the rough faces of the squint have been sufficiently cut or chiselled to a fine enough surface, they are finally rubbed with a piece of fine carborundum to produce the final finish of the squint faces.

Fig. 56 is an illustration showing the practical application of the spirit-level, resting on a short straight-edge, testing the horizontal level of a small pier. The hand which is shown is steadyng the small level and straight-edge. The positions of the various levels are shown by the air bubble in the tube which is encased in the centre of the spirit-level. For example if the bubble is in a position at the right-hand end of the tube (I have marked R for right-hand and L for left-hand ends), the position of the level is high at R and low at L. If the bubble is in a position at the left-hand end of the tube, the position of the level is high at L and low at R. If the bubble is in an exact central position in the tube, the position is exactly level horizontally.

THE THREE-FOOT SPIRIT LEVEL AND HOW TO USE IT

Fig. 56a is an illustration of the stop end of a wall with a three-foot spirit level placed against in a correct vertical position. The level consists of three spirit tubes, two of which as you will see are used for obtaining

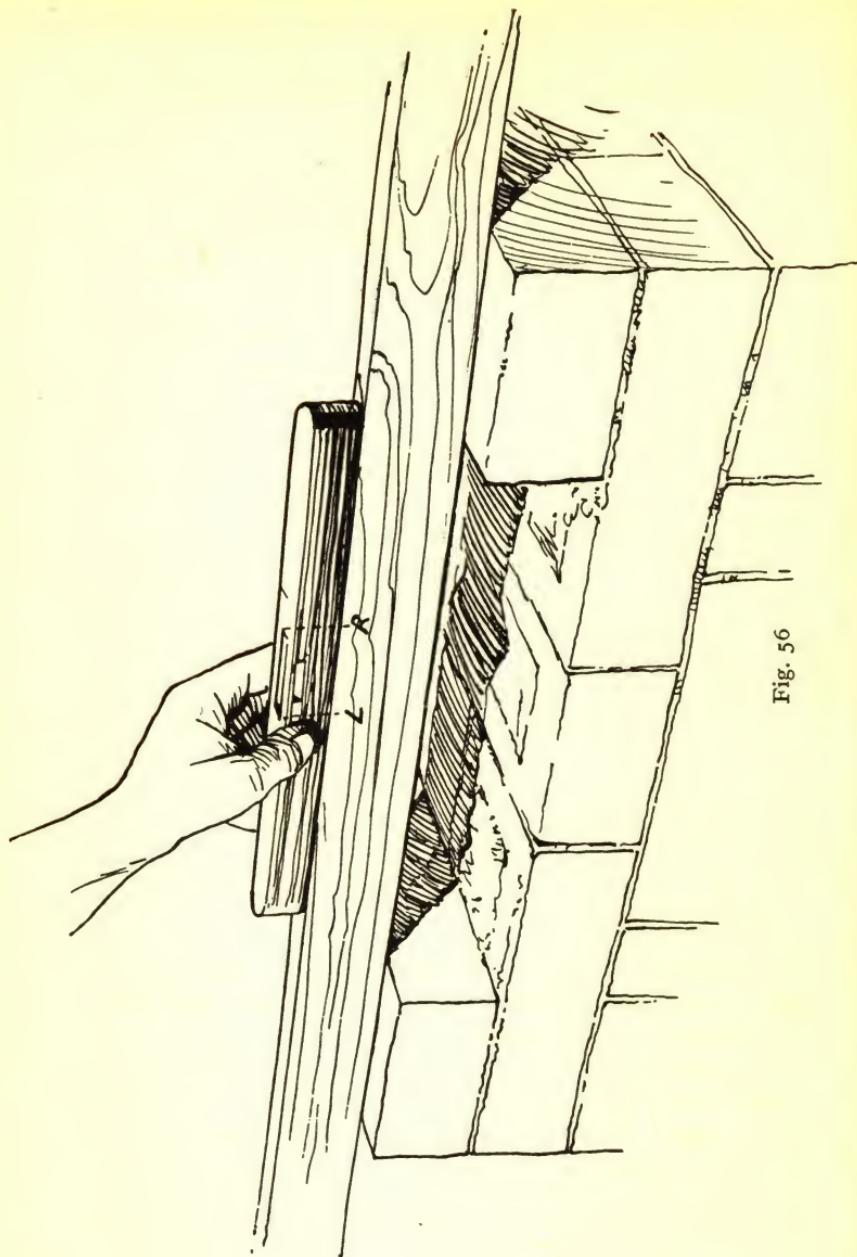


Fig. 56

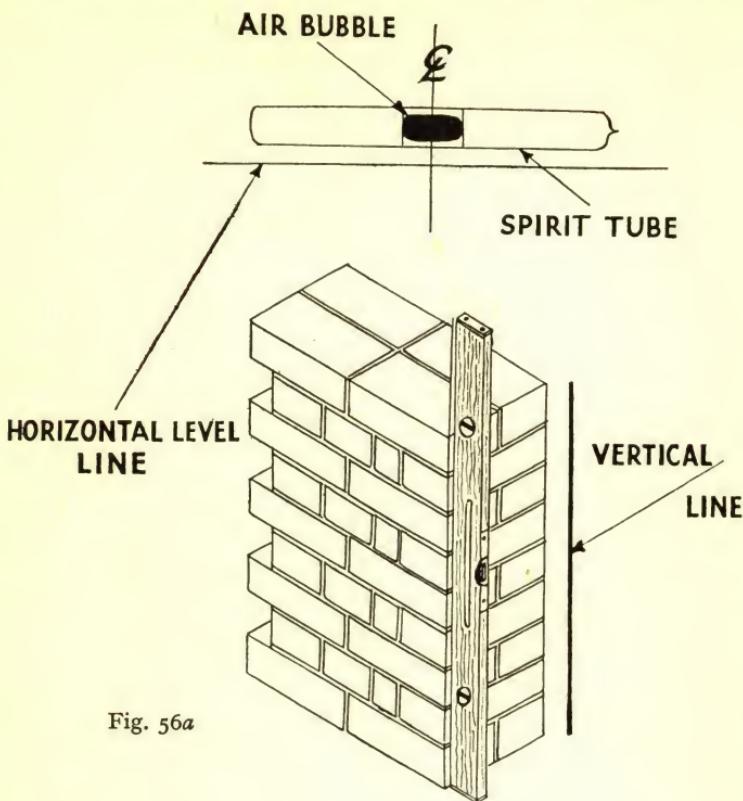


Fig. 56a

the vertical position of the wall, as the position of the spirit level indicates in the diagram. The other spirit tube is used for obtaining a true horizontal level, which is the one shown on the side of the level. The top diagram shows the exact position of the air bubble in the spirit tube when the spirit level is in an exact vertical position against the wall, the air bubble should be in an exact central position, an equal distance on each side of the central line.

Fig. 56b shows the 9in. stop end of wall in a leaning-in or battering position, the spirit tube above therefore shows the different position of the air bubble. Instead of being dead in the centre as in the case of the vertical

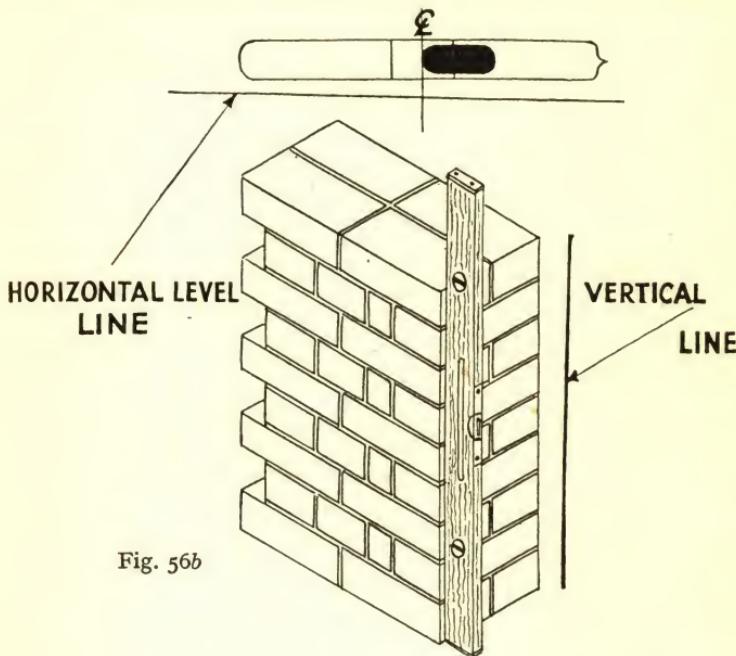


Fig. 56b

position, the air bubble in this case is to the right of the centre line, which shows the lower position of the spirit tube on the left hand side against the horizontal vertical line. In the case of the vertical position as in *Fig. 56a* the spirit tube shows a parallel space between the horizontal line as shown and the bottom line of the spirit tube. The thick vertical line in figure one at the right of the spirit level also shows a parallel space from the wall to the line. *Fig. 56b* shows an unequal space

between the thick line and the wall, the space at the top being much wider than the space at the bottom, therefore showing the battering position of the wall. *Fig. 56c* is the illustration of a wall showing the spirit level against the end of it in an overhanging position.

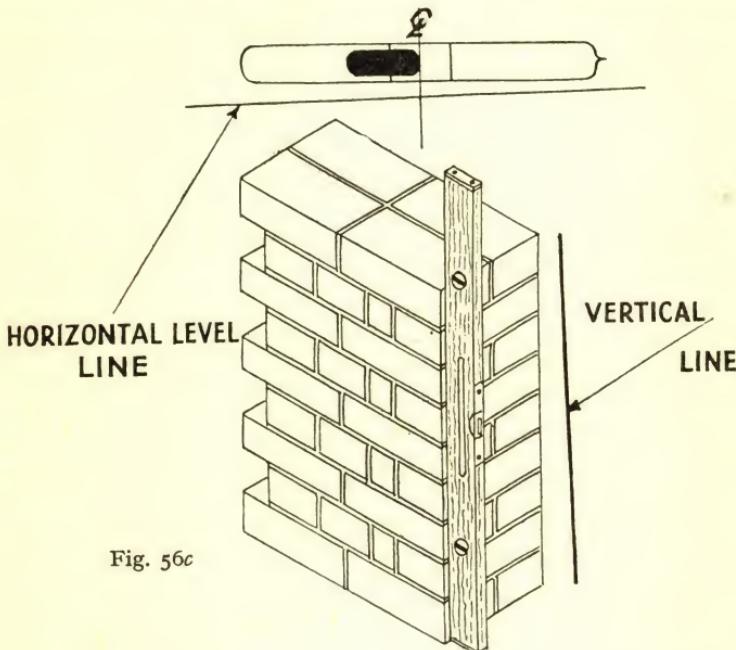


Fig. 56c

The thick line is again vertical, and the distance between it and the wall is unequal, showing much smaller at the top than at the bottom, indicating that the end face of the wall is leaning over or overhanging at the top. The spirit tube again shows the position of the air bubble, which in this case is to the left of the centre line, and in relation to the level horizontal line, the bottom line of the spirit tube is lower on the left hand side.

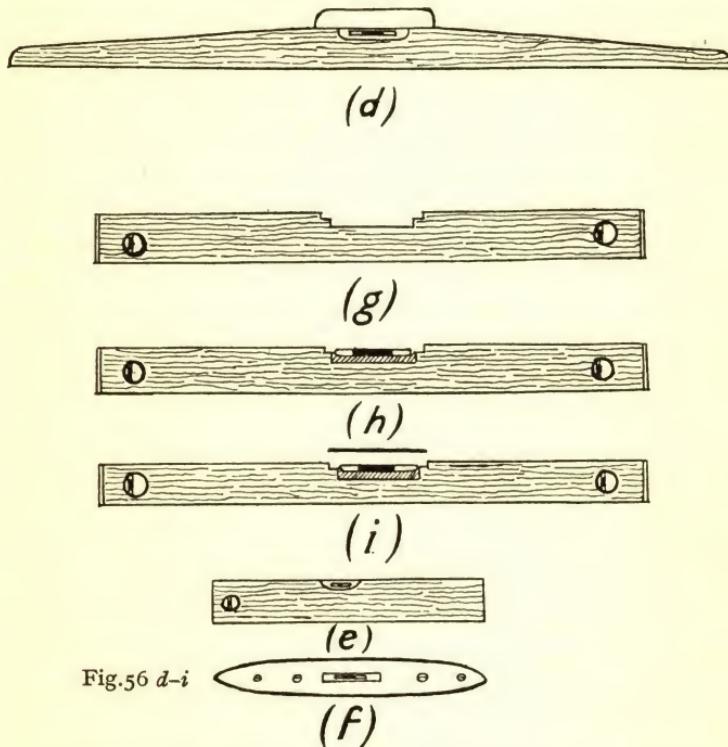
These illustrations have been given to show the beginner the proper way to read the spirit level.

SPIRIT LEVELS IN ORDINARY USE

The spirit levels in ordinary use are the *Long Builders' Level*, the *three-foot straight-edge spirit level* and *small pocket levels* ranging from 4in. to 9in. in length. The long builders' level is usually from 6ft. to 10ft. in length, used generally for horizontal levelling of pegs in trenches and work of a similar nature. *Fig. 56d* is an illustration of the long builders' level, the iron handle attached to it is for carrying it from place to place. The three-foot straight-edge spirit level has already been shown in *Figs. 56a, b and c*, it is used for horizontal levelling of short distances, and also used for obtaining the vertical positions of walls. Pocket levels are generally used for horizontal levelling in conjunction with the ordinary three-foot straight-edge, the pocket level being placed on top of the straight-edge and steadied in order to find the correct horizontal level between short distances. Sometimes there is a small tube inserted to obtain short vertical positions. *Fig. 56c* shows the elevation of a small pocket level (called a boat level) and *Fig. 56f* shows the plan of the boat level.

Repairing the Spirit Tube in a Level. The spirit tube in a level very often gets broken, due to sudden shocks, caused by rough handling. When this occurs the spirit tube has to be taken out, adjusted and bedded into its proper position. First take out the broken tube and clean out the old bed of plaster. This is illustrated in *Fig. 56g* showing the three-foot spirit level with the broken tube removed and the plaster bed cleaned

out thoroughly. *Fig. 56h* shows the new plaster bed with the new spirit tube inserted into it. *Fig. 56i* shows the plaster bed, spirit tube, and the brass plate on top ready to be placed in position and screwed down into the top of the level.

Fig. 56 *d-i*

Bedding and Testing the Level. First place two flat-headed screws into a flat bench at a distance apart equal to about two inches shorter than the length of the spirit level, next obtain a correct three-foot spirit level and place it on the top surface of the screws, and adjust them to the proper horizontal level. The next procedure

is to mix up the plaster and press the new spirit tube into it, and then place the three-foot level you have just repaired on the two screws and adjust the spirit tube to its correct level, and finally screw on the top plate.

Thus I have given the practical applications of the various tools that are in general use. These will be ample for the beginner to practise.

CHAPTER IX

SETTING OUT AND BUILDING A QUOIN

THE BUILDING OF A QUOIN requires great care, for upon it depends the correct vertical positions of the various walls of a building. The first procedure in building the quoin is to set it out correctly (the right-angled quoin only will be dealt with for the beginner; all other quoins of various shapes are built on the same principle). *Fig. 57* is an illustration showing the builder's small square; this is made of wood, and is placed in the position where the quoin is going to be built, and the outside edge is marked with a pencil or a piece of chalk, which represents the right-angled shape, which the faces of the first course of bricks are to be placed against.

Fig. 58 shows the right-angled lines with the quoin brick in position. The next procedure is to bed the first course of bricks in each direction outwards from the quoin brick; this first course should be levelled horizontally and also straightened on the face by the three-foot straight-edge, the edge of which should touch all the faces of the bricks in the course. In the next illustration (*Fig. 59*) you will see a quoin, and on the face of the first course of stretchers you will see double-dotted horizontal lines extending along the whole face; this represents the position of the three-foot straight-edge on the face of the bricks. The

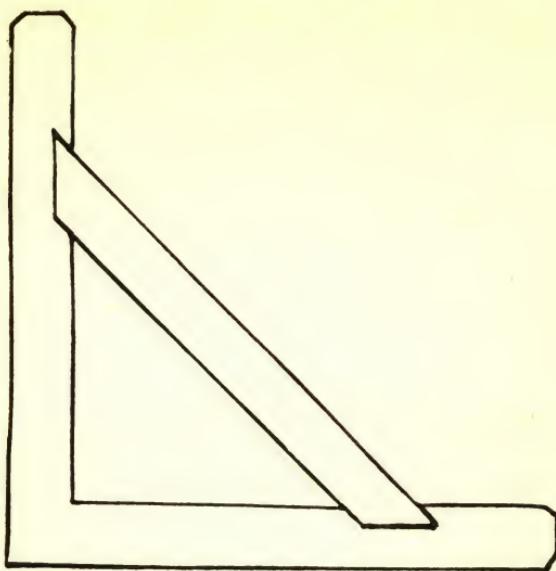


Fig. 57

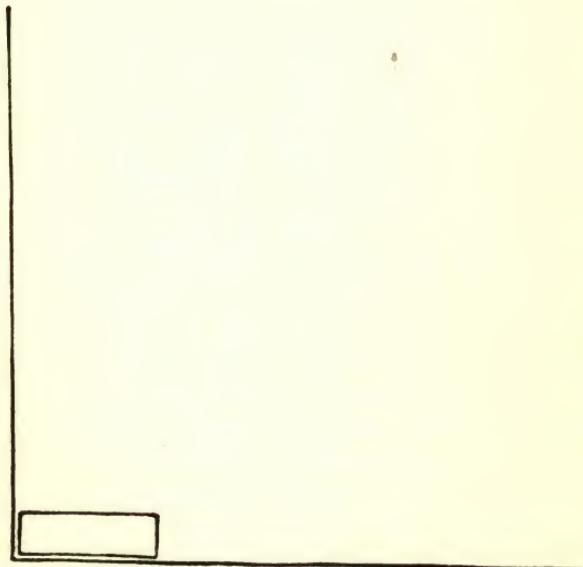


Fig. 58

straight-edge should be held in practically the same position on the faces of the return course of headers, and also horizontally on the top surfaces of them. The vertical height from the top surface of the peg to the top horizontal edge of the first quoin brick should

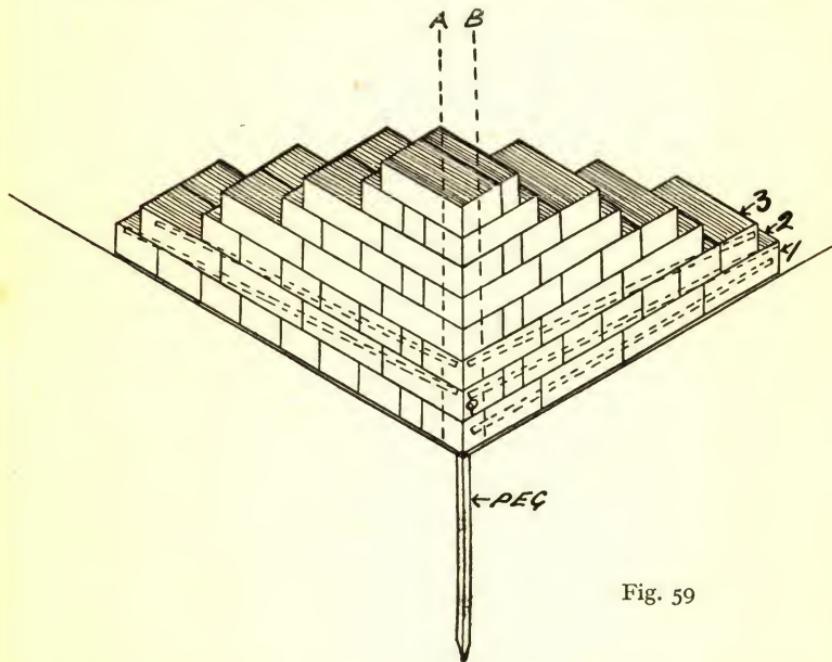


Fig. 59

be 3in., including the joint. All these courses should be built correctly to the gauge of 3in. to each course including the joints; usually these divisions are marked with lines on the three-foot straight-edge, so that when the edge of the straight-edge is placed against the angle of the quoin the lines should correspond, and be in exactly the same horizontal position as the horizontal edges of each quoin brick. This is known as working

the brick quoin to gauge. The peg which is shown is usually placed in a permanent position, and the straight-edge can be rested on it, for the purpose of gauging the brick quoin. When the quoins reach a much greater height, a longer rod is used, which is also divided into 3in. divisions; this is called a gauge rod and is usually about 10ft. in length. The next procedure is to bed the second quoin brick, and to make sure that the two quoin bricks are vertical; the plumb-rule is used to check the faces at each side of the angle point. The vertical dotted lines A and B represent the positions at which the plumb-rule should be placed in order to adjust the correct vertical position of the quoin bricks. Having laid the second quoin brick, and made sure that the two quoin bricks are in a correct vertical position, we can now proceed to bed the rest of the second course, on each side of the return angle point. Having done this, we must straighten them first in relation to their horizontal positions (this has already been explained in relation to the use of the level and straight-edge) by the level and short straight-edge. After doing this, we must straighten the faces of each course; this is done by holding the edge of the straight-edge against the faces of the second course, in an inclined position, so that the highest end is against the face of the second quoin brick, which is marked Q, and the other end touching the face of the highest end of the stretcher in the end of the first course, marked $\leftarrow/$. Thus we have two points which we use for checking the positions of the second course of headers, to see whether they are vertical, and similarly with the second course of stretchers which are shown on the return face of the quoin. The two points which I have

just mentioned are correct, because Q has been checked by the plumb-rule and its vertical position obtained, and point $\leftarrow/$ is also in its correct position, having been checked by the square as to the correct right-angle position of the quoin; therefore you will see that the second double-dotted line from the base covers the faces of the bricks as shown in the second course in both directions from the quoin angle. The faces of the third course are obtained by the same method again, as shown by the third double-dotted line from the base of the quoin, until the required height is obtained. The method shown at each end of the quoin, where you see that each course is stepped back from the preceding one, is known as racking back. If a long length of wall is required to be built, another quoin is placed in position (similar to the one shown) in the same frontage line at the required distance from the first, and the intervening space filled in, course by course, to a line, which is stretched from either corner and secured by line pins inserted in the quoin cross joints.

CHAPTER X

READING THE SCALE-RULE IN RELATION TO DRAWING EXAMPLES OF BRICKWORK BY A SIMPLE METHOD

To copy various examples of brickwork (which are shown at the end of this book) it is essential that one should be able to read the scale-rule, in order to draw to a certain scale and represent the actual full-size construction. It will be quite understood that we cannot draw the various full-size constructions of brickwork on paper, therefore we have to draw them on a small scale.

Fig. 60 is an illustration showing two halves of a 12in.-scale box rule (actual size), on which four separate scales are represented, viz. $\frac{1}{8}$ in., $\frac{1}{4}$ in., $\frac{1}{2}$ in., and 1in. The scale which is used in elementary brickwork is the 1in. scale, and the drawing which is drawn to a scale of 1in.=1ft. means that we take 1ft. or 12in. of the actual full-size construction, and represent it on the actual drawing by 1in., therefore 1in. in the drawing represents 1ft. of actual brickwork.

In order to make drawing to scale as simple as possible, I have introduced an easy method of obtaining the various measurements from the scale-rule, for the

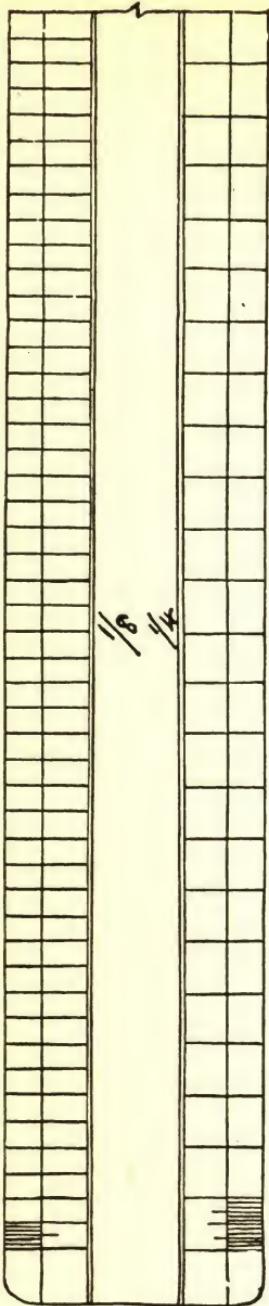
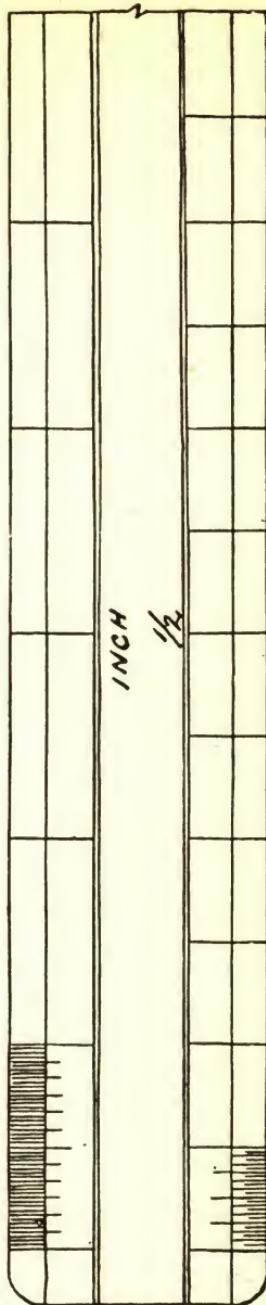


Fig. 60



various lengths required for drawing the examples of brickwork in this book; thus if you look at *Fig. 61* you will see that the illustration shows an enlarged inch taken from the inch on the box scale-rule, in order to see the divisions more plainly. This enlarged inch represents one foot, drawing to a scale of one inch to the foot. The enlarged inch which represents a foot is divided into forty-eight divisions; these each represent $\frac{1}{48}$ in. Next we have the twelve divisions of 1 in., and then we have four divisions of 3 in., making the enlarged inch complete. The thick black horizontal lines represent various measurements taken from the above enlarged inch, which are to a scale of 1 in. = 1 ft. The length of the first thick black horizontal line represents 1 in. drawn to a scale of 1 in. = 1 ft., or $\frac{1}{12}$ th of the enlarged inch above, which represents 1 ft. The actual length of the thick line is $\frac{1}{12}$ th of an inch. The second thick line represents a length of $1\frac{1}{2}$ in. drawn to a scale of 1 in. = 1 ft. The third thick line represents a length of $2\frac{1}{4}$ in. drawn to a scale of 1 in. = 1 ft. This length represents the width of a closer. The length of the black fourth line represents 3 in., the height of a course of brickwork. The fifth black line represents the length or width of a half brick, or bat, which is $4\frac{1}{2}$ in. The sixth black line represents the length equal to two courses of brickwork in height, which is 6 in. The seventh black line represents the length equal to the three-quarter bat, which is $6\frac{3}{4}$ in. The eighth black line represents the length equal to a stretcher, which is 9 in. The last black line, at the bottom, represents 12 in. drawn to a scale of 1 in. = 1 ft.; the actual length of the line if taken from the box scale-rule is 1 in. in length.

Fig. 62 is an illustration showing how the plans of two courses of a one-brick wall is drawn to a scale of 1 in. = 1 ft. First draw the base line AB, and divide this into four 9 in. divisions, which is $\frac{3}{4}$ in. taken from the inch scale. These divisions represent the lengths of four stretchers; the whole length represented is 3 ft. 0 in.

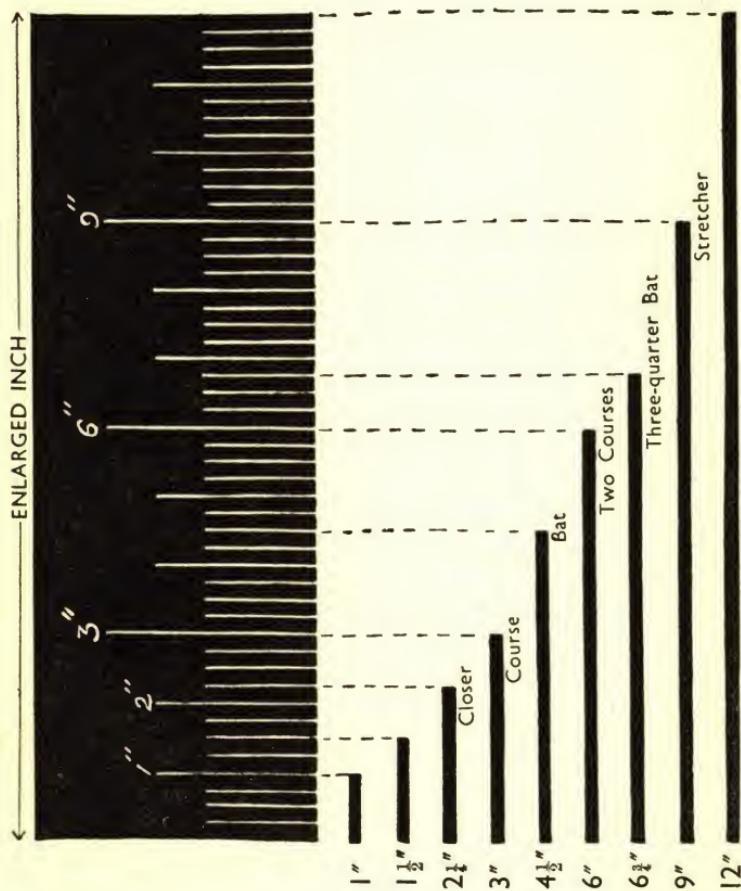


Fig. 62

Now set up two perpendicular lines at each end of the base line at points A and B for a distance of 9in. drawn to scale; these lines are usually obtained by the set square being placed on the base line. Then join the points C and D. Now draw perpendicular lines from the division points on the base line at G, H, and I, to the horizontal line CD. Next divide the perpendicular lines AC and BD into two equal parts and draw the horizontal line from E to F. We have now a representa-

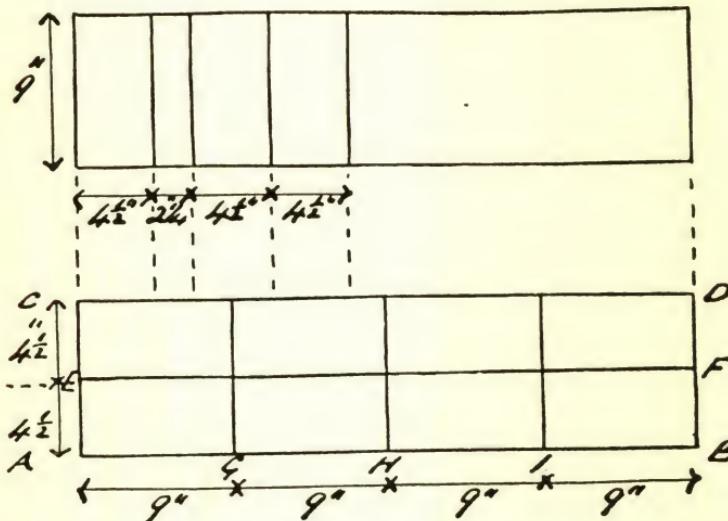


Fig. 62

tive line-drawing of the plan of a one-brick wall 3ft. in length, showing the stretcher course, consisting of four face stretchers and four back stretchers, which completes the 9in. thickness of the wall; this we can call the first course or stretcher course.

The second course, you will see, is the header course.

The outline is obtained in the same way as the stretcher course, but the divisions are different; these measurements are shown starting from left to right on the base line, viz. $4\frac{1}{2}$ in. representing header, next to it $2\frac{1}{4}$ in. representing closer, and two more headers following. The student or beginner, having studied the foregoing explanatory notes, etc., should be able to draw a few simple brickwork constructions to the 1 in. = 1 ft. scale.

CHAPTER XI

THE NAMES AND EXAMPLE SHEETS OF BRICKWORK

THESE EXAMPLES, as shown on pp. 94-124, can be practised, and drawn to scale; in doing so, the student will be able to grasp the principles of bonds of various constructions which are used in general bricklaying.

Illustrations, on pp. 94-5, of the elevations of various bonds:

Fig. 63. English bond with two stop ends.

Fig. 64. Flemish bond with one stop end and one toothed end.

Fig. 65. English garden-wall bond with one stop end and one toothed end.

Fig. 66. Flemish garden-wall bond with one stop end and one toothed end.

Fig. 67. Stretching bond with two stop ends.

Fig. 68. Heading bond with two stop ends.

Illustrations on pp. 96-8 show the sections of walls of various thicknesses, with footings and concrete, also plans of footing courses:

Fig. 69. Section of 9in. wall with footings and concrete.

Fig. 70. Section of 13½in. wall with footings and concrete.

Fig. 71. Section of 18in. wall with footings and concrete.

Fig. 72. Section of 23in. wall with footings and concrete.

Fig. 73. Section of 27in. wall with footings and concrete.

Fig. 74. Plan of first or bottom course of footings to a 13½in. wall.

Fig. 75. Plan of second course of footings to a 13½in. wall.

Fig. 76. Plan of third course of footings to a 13½in. wall.

Fig. 77. Plan of nest work at the quoin of a 13½in. wall.

Illustrations on pp. 99-102 show the plans of right-angled quoins in English and Flemish bond:

Fig. 78. Plans of two courses of a 9in. quoin in English bond.

Fig. 79. Plans of two courses of a 13½in. quoin in English bond.

Fig. 80. Plans of two courses of an 18in. quoin in English bond.

Fig. 81. Plans of two courses of a 9in. quoin in Flemish bond.

Fig. 82. Plans of two courses of a 13½in. quoin in Flemish bond.

Fig. 83. Plans of two courses of an 18in. quoin in Flemish bond.

Fig. 84. Plans of two courses of a 23in. quoin in English bond.

Fig. 85. Plans of two courses of a 23in. quoin in Flemish bond.

Illustrations on pp. 103-4 are of detached piers, showing the plans of various courses in English and Flemish bond.

Fig. 86. Plans of two courses of a 13½in. pier in English bond.

Fig. 87. Plans of two courses of a 13½in. pier in English bond (another method of bonding).

Fig. 88. Plans of two courses of an 18in. pier in English bond.

Fig. 89. Plans of two courses of a 23in. pier in English bond.

Fig. 90. Plans of two courses of a 27in. pier in English bond.

Fig. 91. Plans of two courses of a 13½in. pier in Flemish bond.

Fig. 92. Plans of two courses of an 18in. pier in Flemish bond.

Fig. 93. Plans of two courses of a 23in. pier in Flemish bond.

Fig. 94. Plans of two courses of a 27in. pier in Flemish bond.

Fig. 95. Plans of two courses of a 27in. pier in Flemish bond (another method of bonding).

Illustrations on pp. 105-6 are of attached piers, showing the plans of various courses in English and Flemish bond.

Fig. 96. Plans of two courses of a 9in. wall with attached pier 9in. \times 2½in. in English bond.

Fig. 97. Plans of two courses of a 9in. wall with attached pier 13½in. \times 2½in. in English bond.

Fig. 98. Plans of two courses of a 9in. wall with attached pier 18in. \times 2½in. in English bond.

Fig. 99. Plans of two courses of a 9in. wall with attached pier 23in. \times 2½in. in English bond.

Fig. 100. Plans of two courses of a 9in. wall with attached pier 27in. \times 2½in. in English bond.

Fig. 101. Plans of two courses of a 9in. wall with attached pier 9in. $\times 4\frac{1}{2}$ in. in English bond.

Fig. 102. Plans of two courses of a 9in. wall with attached pier 13 $\frac{1}{2}$ in. $\times 4\frac{1}{2}$ in. in English bond.

Fig. 103. Plans of two courses of a 9in. wall with attached pier 18in. $\times 4\frac{1}{2}$ in. in English bond.

Fig. 104. Plans of two courses of a 9in. wall with attached pier 23in. $\times 4\frac{1}{2}$ in. in English bond.

Fig. 105. Plans of two courses of a 9in. wall with attached pier 27in. $\times 4\frac{1}{2}$ in. in English bond.

Illustrations on pp. 107-9 are of plans of various courses, showing reveals, also right-angled quoins, with walls of unequal thickness, and plans of two piers attached to 9in. wall.

Fig. 106. Plans of two courses of a 13 $\frac{1}{2}$ in. wall with 4 $\frac{1}{2}$ in. reveal in English bond.

Fig. 107. Plans of two courses of a 13 $\frac{1}{2}$ in. wall with 4 $\frac{1}{2}$ in. reveal in Flemish bond.

Fig. 108. Plans of two courses of a right-angled quoin with 9in. wall in English bond, and a 4 $\frac{1}{2}$ in. wall running into it in stretching bond.

Fig. 109 and *Fig. 110.* Plans of 13 $\frac{1}{2}$ in. walls and 18in. walls in English bond with 4 $\frac{1}{2}$ in. walls running into the angle.

Fig. 111. Plans of two courses showing two 18in. \times 18in. piers attached by a centre 9in. wall; the two piers are in English bond and the 9in. wall is in Flemish garden-wall bond.

Illustrations on pp. 110-13 are of plans showing walls various thicknesses joined to each other.

Fig. 112. Plans of two courses of a 4 $\frac{1}{2}$ in. wall bonded into a 9in. wall English and stretching bond.

Fig. 113. Plans of two courses of a $4\frac{1}{2}$ in. wall bonded into a $13\frac{1}{2}$ in. wall English and stretching bond.

Fig. 114. Plans of two courses of a $4\frac{1}{2}$ in. wall bonded into an 18in. wall English and stretching bond.

Fig. 115. Plans of two courses of a $4\frac{1}{2}$ in. wall bonded into a 23in. wall English and stretching bond.

Fig. 116. Plans of two courses of a 9in. wall bonded into a $13\frac{1}{2}$ in. wall in English bond.

Fig. 117. Plans of two courses of a 9in. wall bonded into an 18in. wall in English bond.

Fig. 118. Plans of two courses of a $13\frac{1}{2}$ in. wall bonded into an 18in. wall in English bond.

Fig. 119. Plans of two courses of a $13\frac{1}{2}$ in. wall bonded into a 23in. wall in English bond.

Illustrations on pp. 114-16 are of plans showing single junction walls.

Fig. 120. Plans of two courses showing the single junction of a 9in. wall in Flemish bond.

Fig. 121. Plans of two courses showing the single junction of a 9in. wall in English bond.

Fig. 122. Plans of two courses showing the single junction of a $13\frac{1}{2}$ in. wall in Flemish bond.

Fig. 123. Plans of two courses showing the single junction of a $13\frac{1}{2}$ in. wall in English bond.

Fig. 124. Plans of two courses showing the single junction of an 18in. wall in Flemish bond.

Fig. 125. Plans of two courses showing the single junction of an 18in. wall in English bond.

Illustrations on pp. 117-21 show plans of double junction walls.

Fig. 126. Plans showing two courses of a double junction 9in. wall in English bond.

Fig. 127. Plans showing two courses of a double junction 9in. wall in Flemish bond.

Fig. 128. Plans showing two courses of a double junction 13½in. wall in English bond.

Fig. 129. Plans showing two courses of a double junction 13½in. wall in Flemish bond.

Fig. 130. Plans showing two courses of a double junction 18in. wall in English bond.

Fig. 131. Plans showing two courses of a double junction 18in. wall in Flemish bond.

Illustrations on pp. 122-24 show plans of various chimney courses.

Fig. 132. Plans of two courses of a chimney stack containing three 9in. \times 9in. flues, with 4½in. external walls in chimney bond.

Fig. 133. Plans of two courses of a chimney stack containing three 9in. \times 9in. flues, with 9in. external walls in English bond.

Fig. 134. Plans of two courses of a chimney stack containing three 13½in. \times 9in. flues, with 4½in. external walls in chimney bond.

Fig. 135. Plans of two courses of a chimney stack containing three 13½in. \times 9in. flues, with 9in. external walls in English bond.

Fig. 136. Plans of two courses of a grouped chimney stack, containing two 9in. \times 9in. flues and two 13½in. \times 9in. flues with 4½in. external walls in chimney bond.

Fig. 137. Plans of two courses of another grouped chimney stack containing six flues, four 9in. \times 9in. flues and two 13½in. \times 9in. flues with 4½in. external walls in chimney bond.

94 BRICKLAYING FOR BEGINNERS
ENGLISH BOND

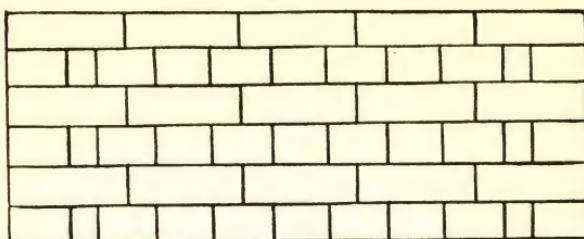


Fig. 63

FLEMISH BOND

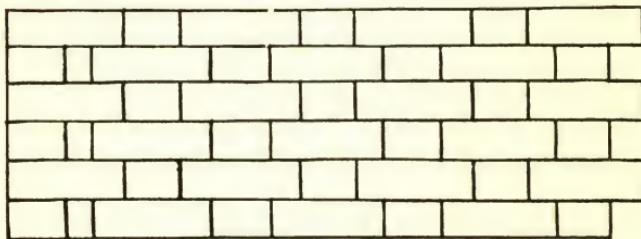


Fig. 64

ENGLISH GARDEN-WALL BOND

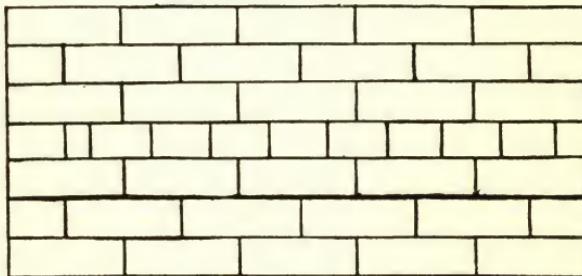


Fig. 65

EXAMPLE SHEETS OF BRICKWORK 95

FLEMISH GARDEN-WALL BOND

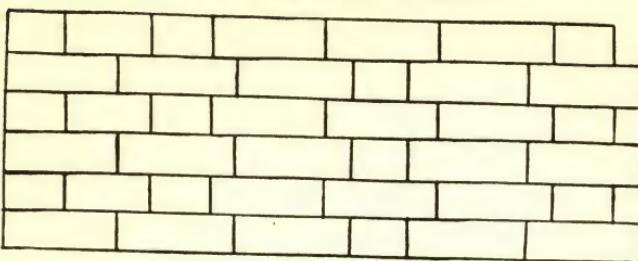


Fig. 66

STRETCHING BOND

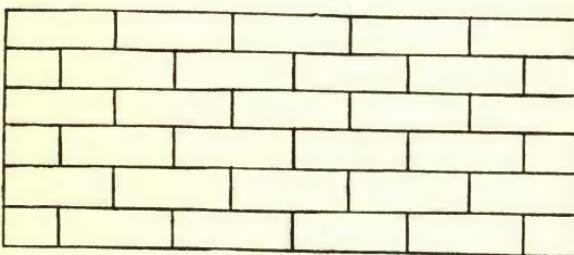


Fig. 67

HEADING BOND

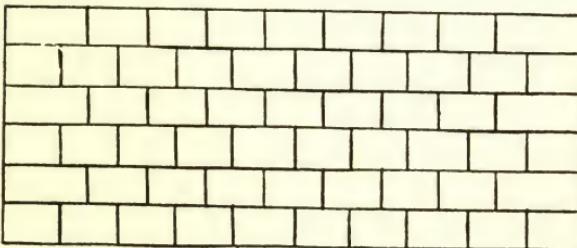


Fig. 68

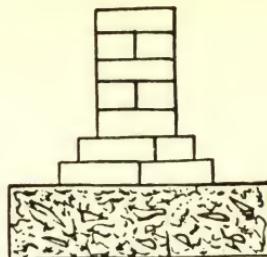


Fig. 69

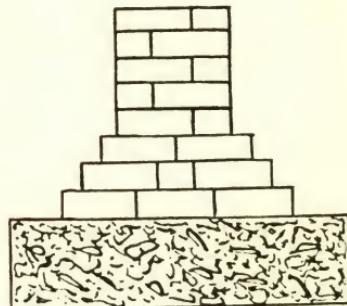


Fig. 70

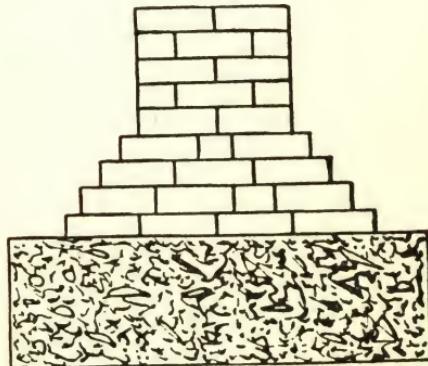


Fig. 71

EXAMPLE SHEETS OF BRICKWORK 97

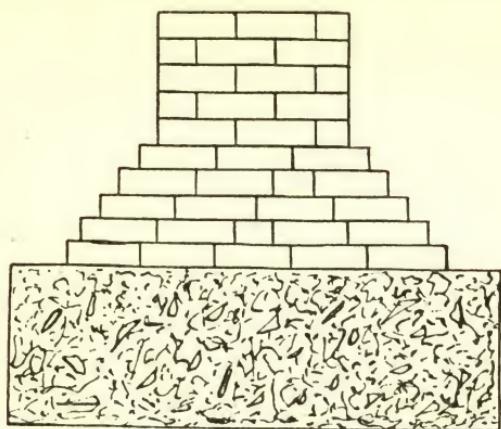


Fig. 72

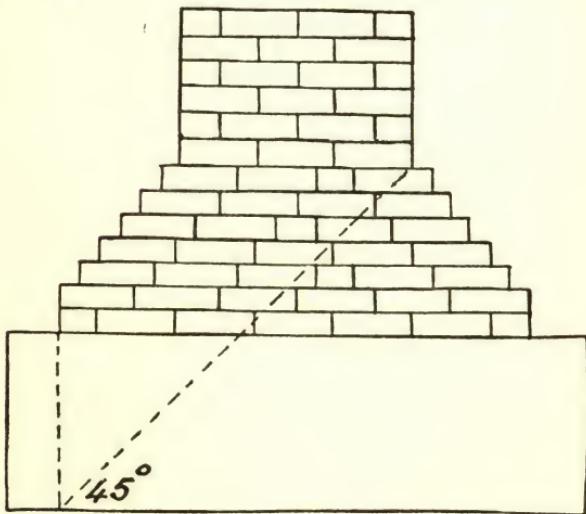
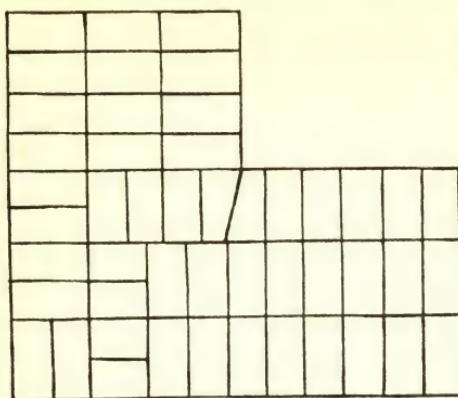


Fig. 73

GB



FOOTINGS TO
13½IN. QUOINS

Fig. 74

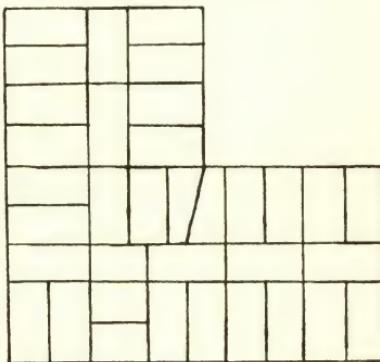


Fig. 75

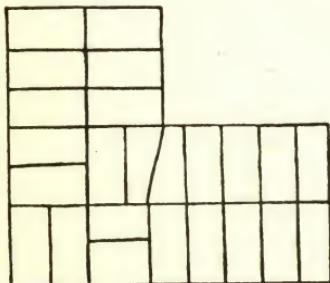


Fig. 76

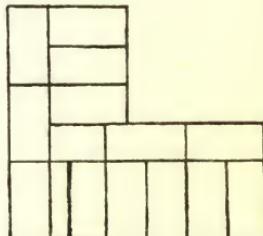


Fig. 77

EXAMPLE SHEETS OF BRICKWORK 99

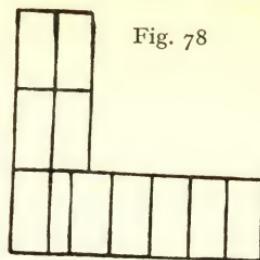
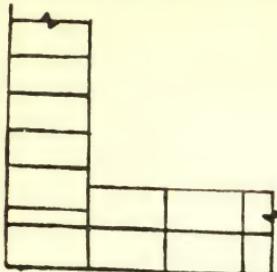


Fig. 78

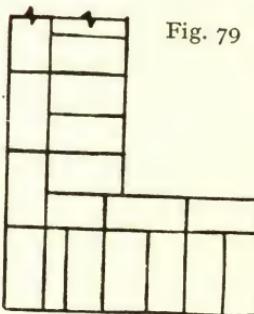
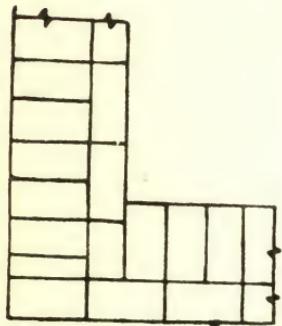


Fig. 79

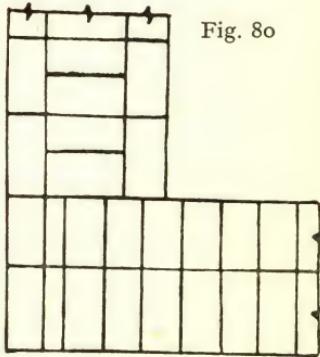
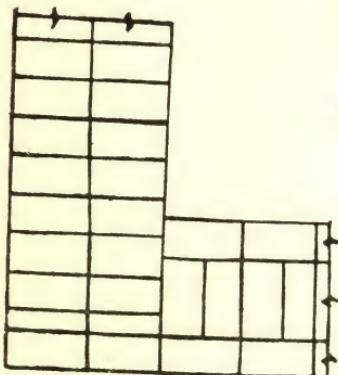
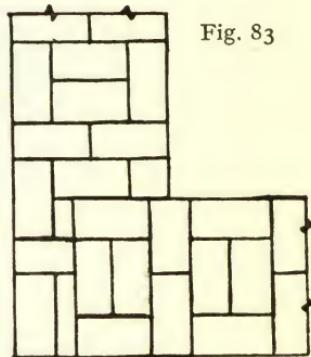
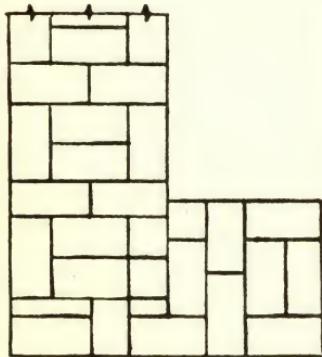
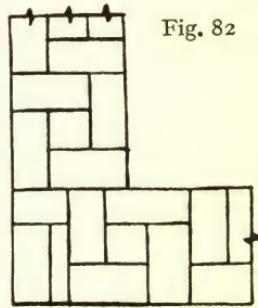
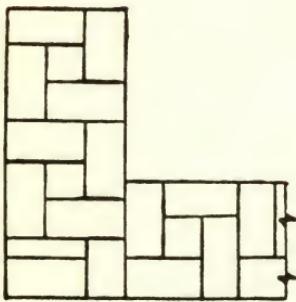
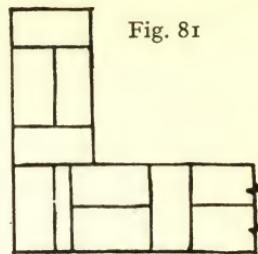
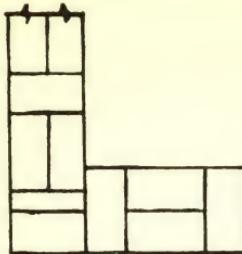


Fig. 80



EXAMPLE SHEETS OF BRICKWORK 101

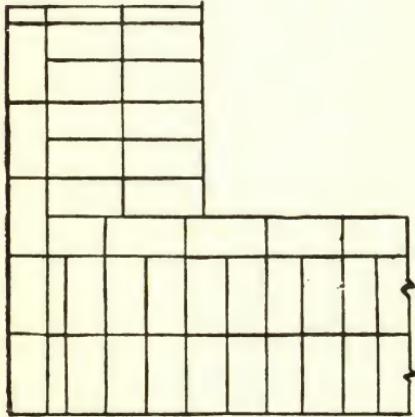
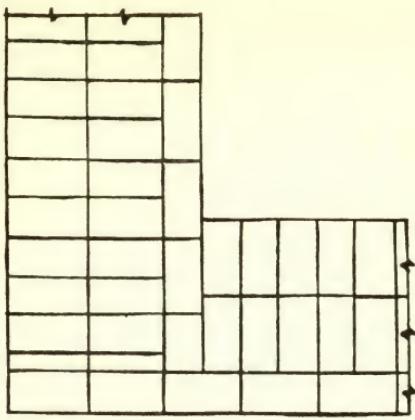


Fig. 84

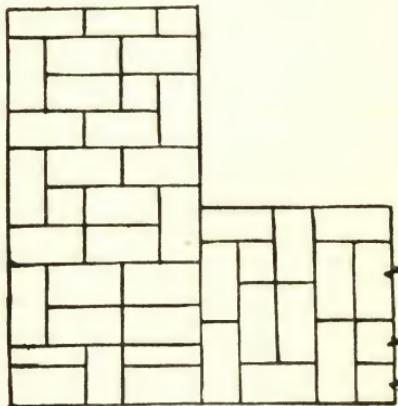
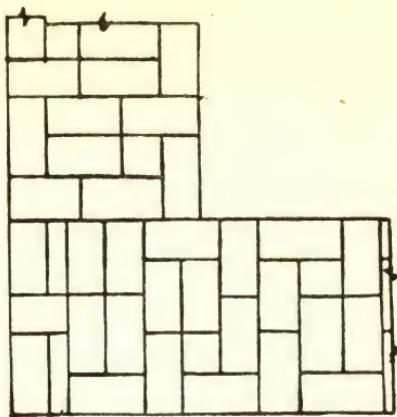


Fig. 85

EXAMPLE SHEETS OF BRICKWORK 103

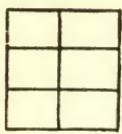


Fig. 86

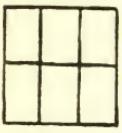


Fig. 87

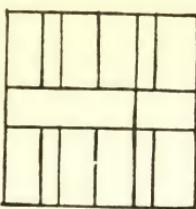


Fig. 88

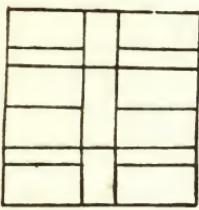


Fig. 89

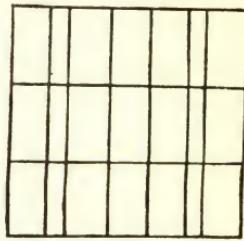


Fig. 90

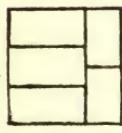


Fig. 91

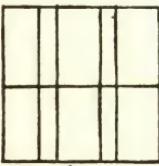
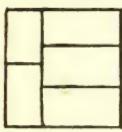
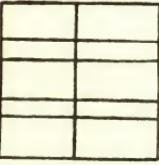


Fig. 93



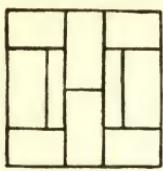


Fig. 91

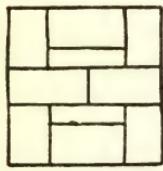


Fig. 92

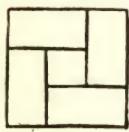
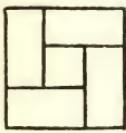


Fig. 93

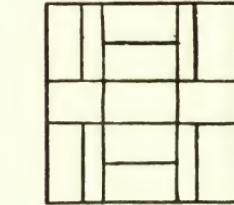


Fig. 94

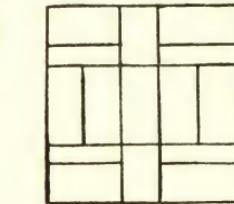
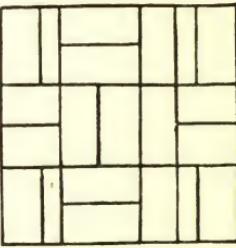


Fig. 95



EXAMPLE SHEETS OF BRICKWORK

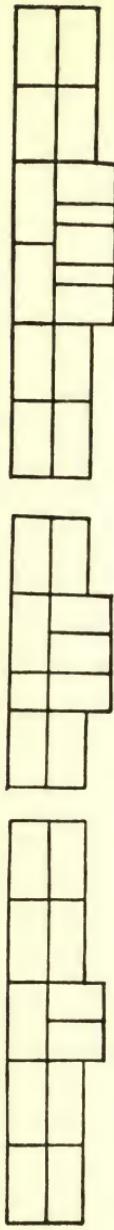


Fig. 96

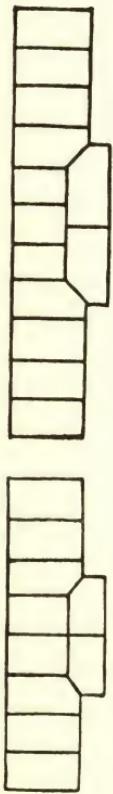


Fig. 97

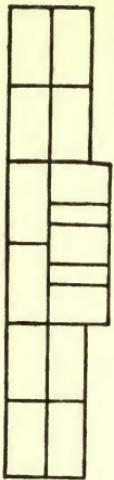


Fig. 98

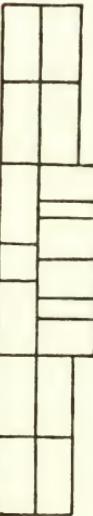


Fig. 99

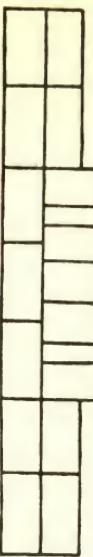
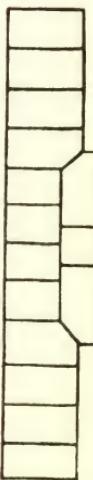


Fig. 100



EXAMPLE SHEETS OF BRICKWORK

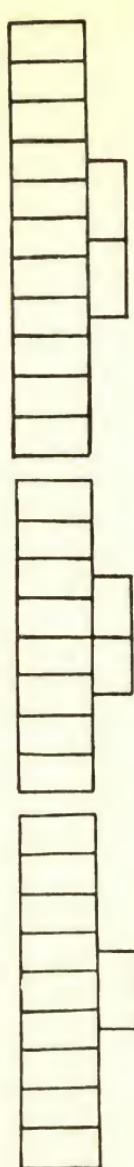
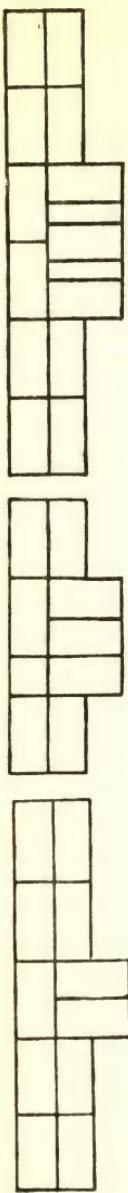


Fig. 102

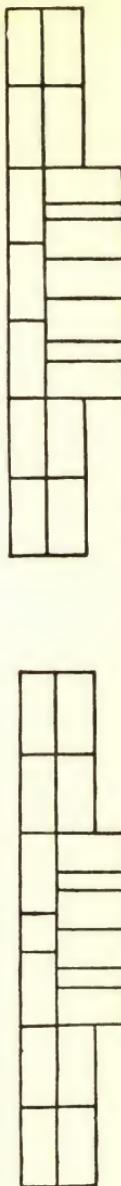


Fig. 103

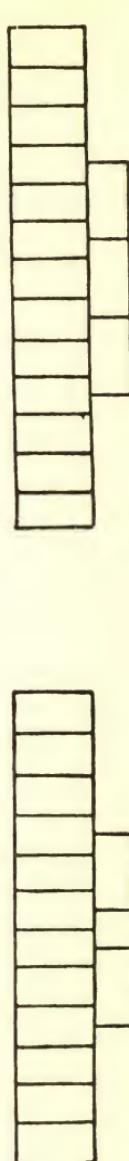


Fig. 104

Fig. 105

EXAMPLE SHEETS OF BRICKWORK 107

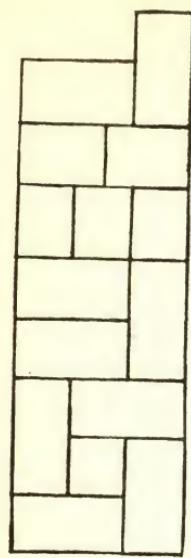


Fig. 106

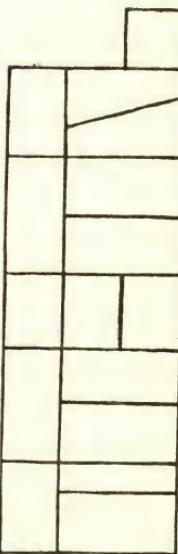
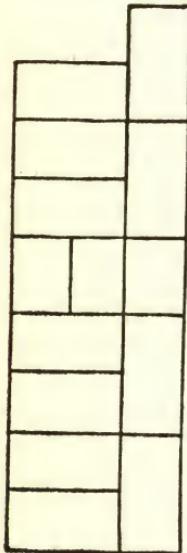
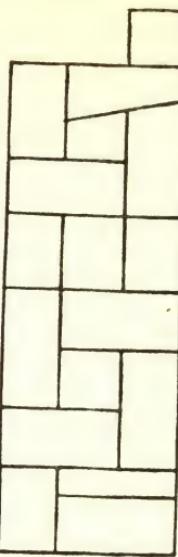


Fig. 107



EXAMPLE SHEETS OF BRICKWORK

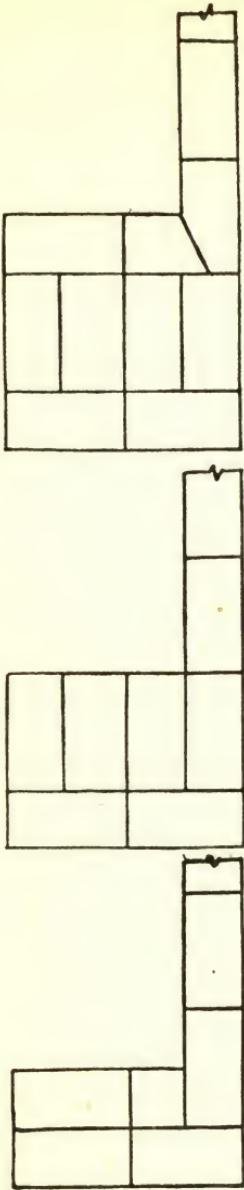


Fig. 108

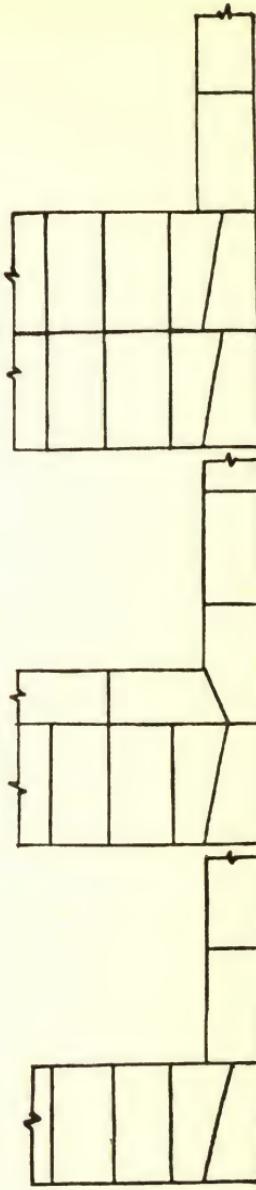


Fig. 109

Fig. 110

EXAMPLE SHEETS OF BRICKWORK 109

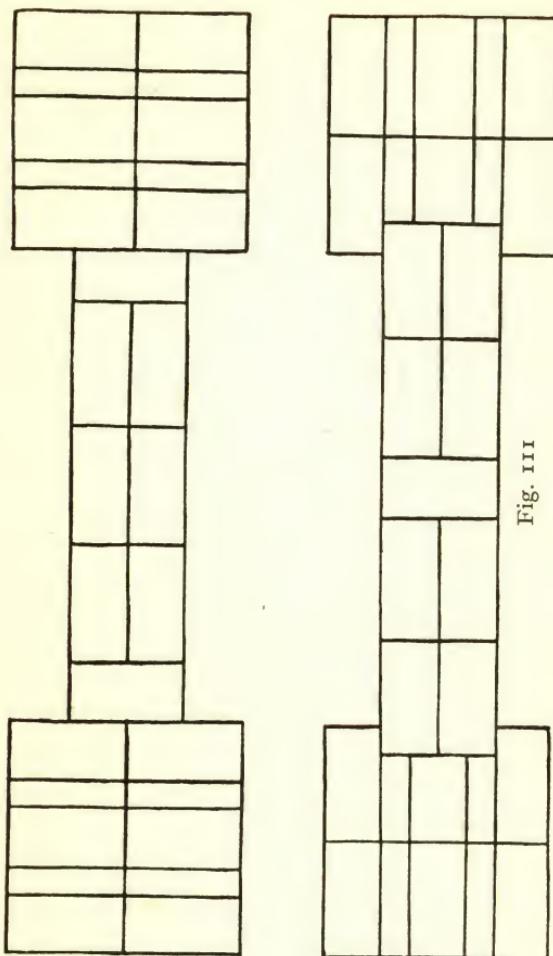


Fig. III

110 BRICKLAYING FOR BEGINNERS

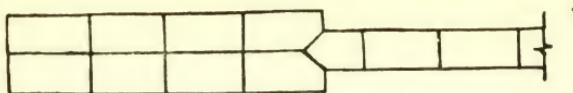


Fig. 112

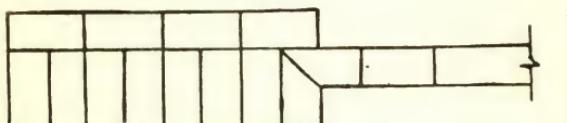
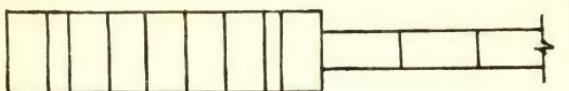


Fig. 113

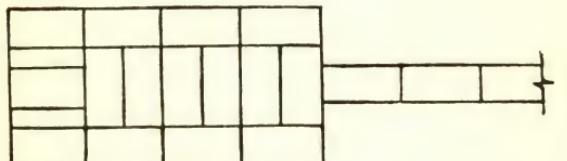
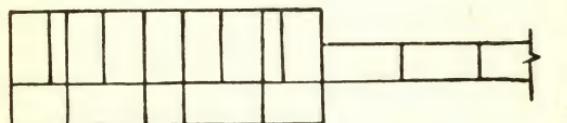
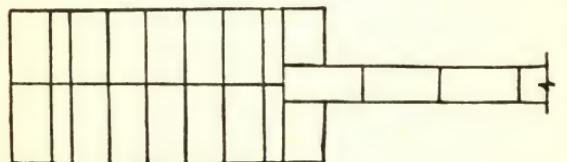


Fig. 114



EXAMPLE SHEETS OF BRICKWORK III

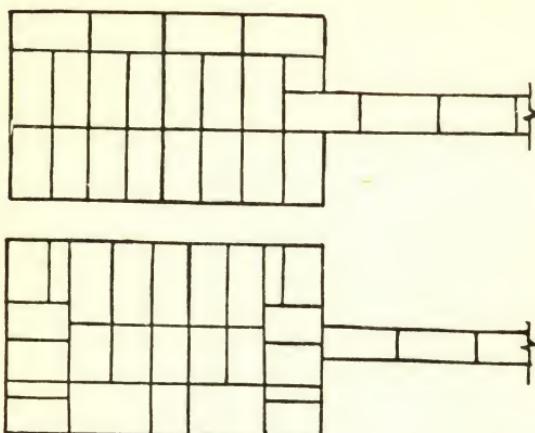


Fig. 115

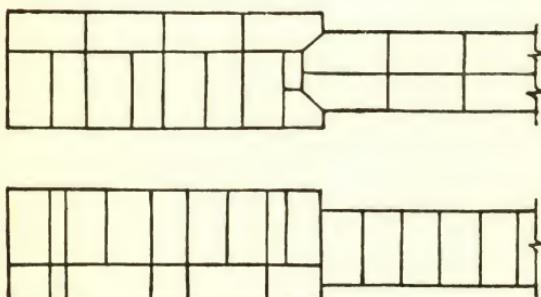


Fig. 116

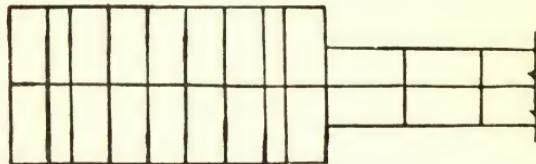
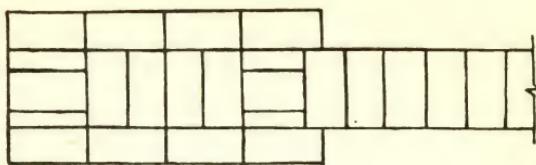


Fig. 117

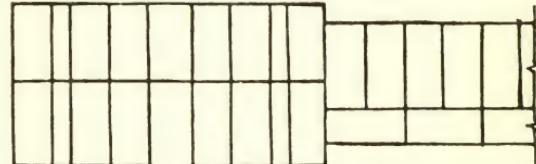
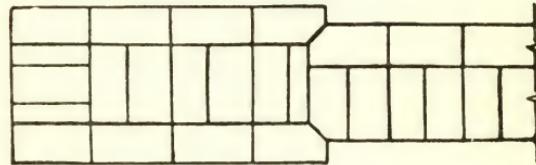


Fig. 118

EXAMPLE SHEETS OF BRICKWORK 113

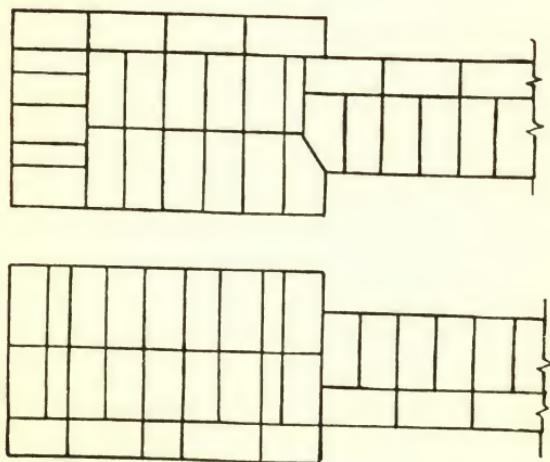


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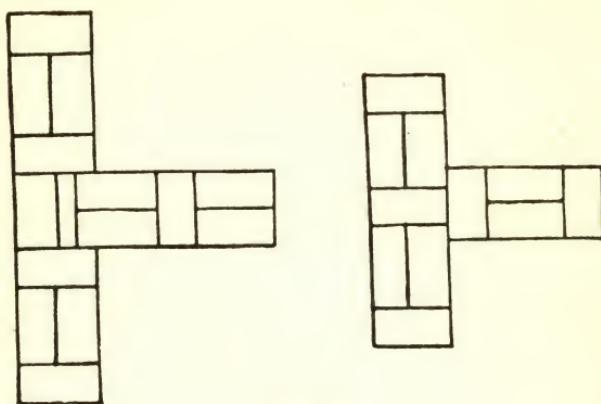


Fig. 120

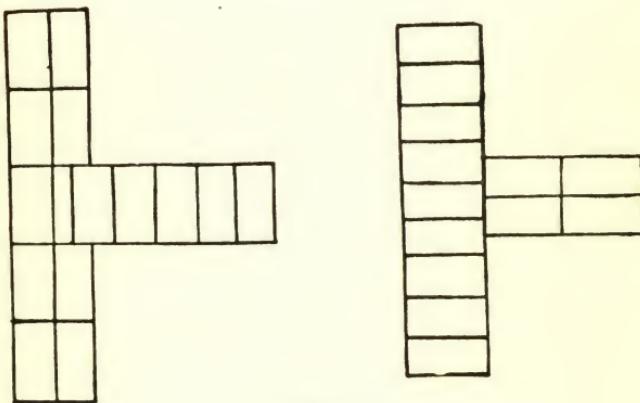


Fig. 121

EXAMPLE SHEETS OF BRICKWORK 115

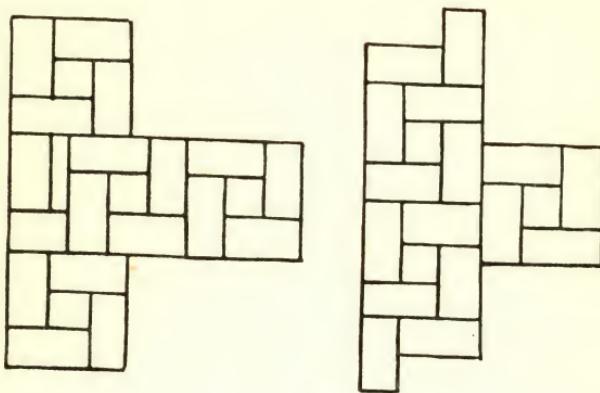


Fig. 122

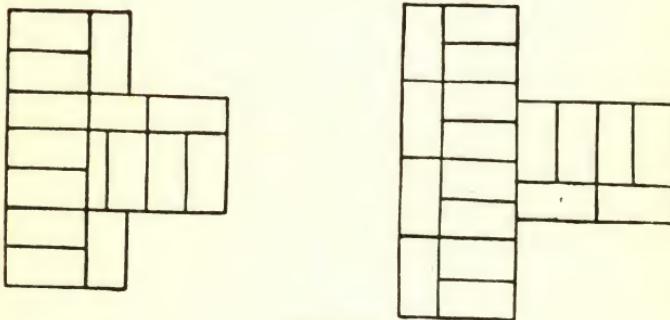


Fig. 123

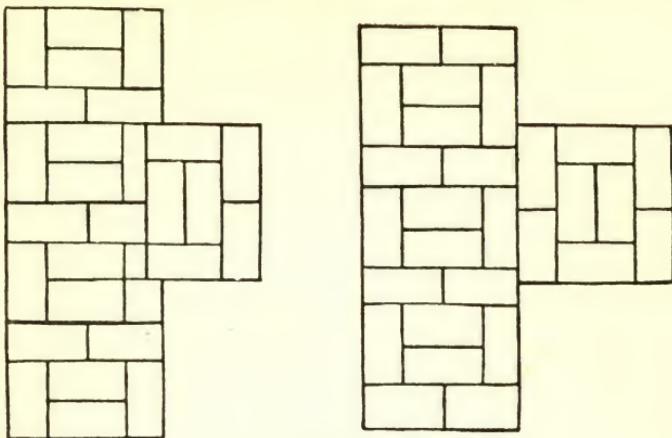


Fig. 124

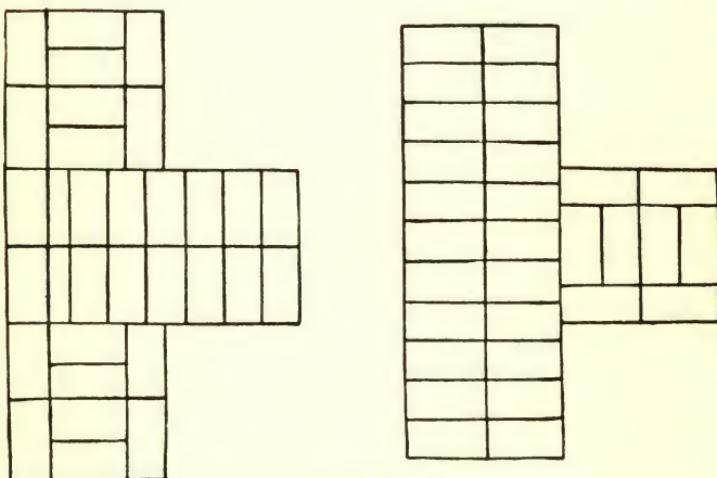


Fig. 125

EXAMPLE SHEETS OF BRICKWORK 117

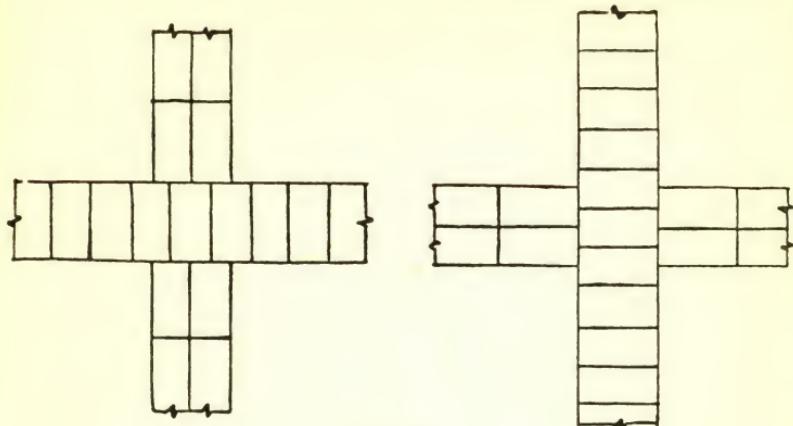


Fig. 126

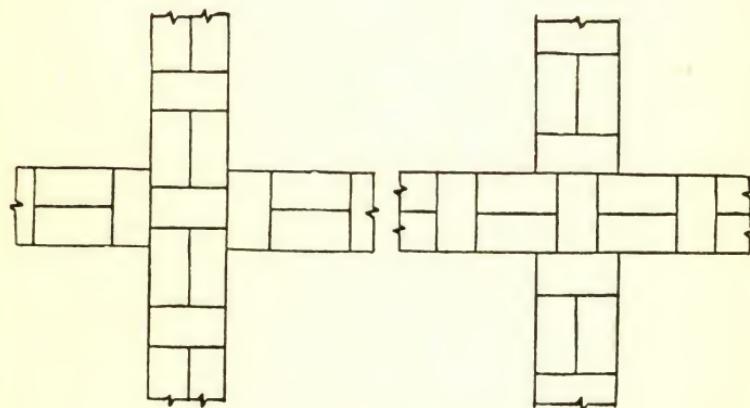


Fig. 127

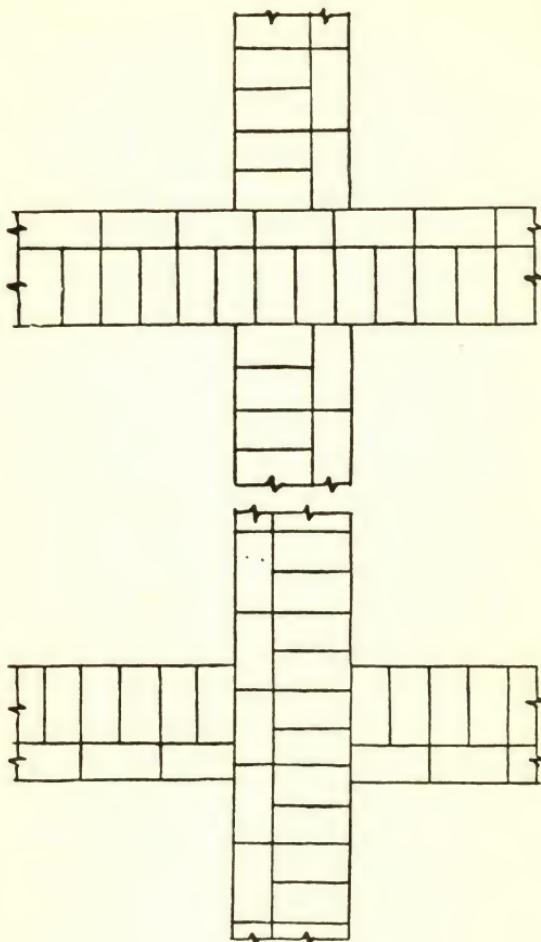


Fig. 128

EXAMPLE SHEETS OF BRICKWORK 119

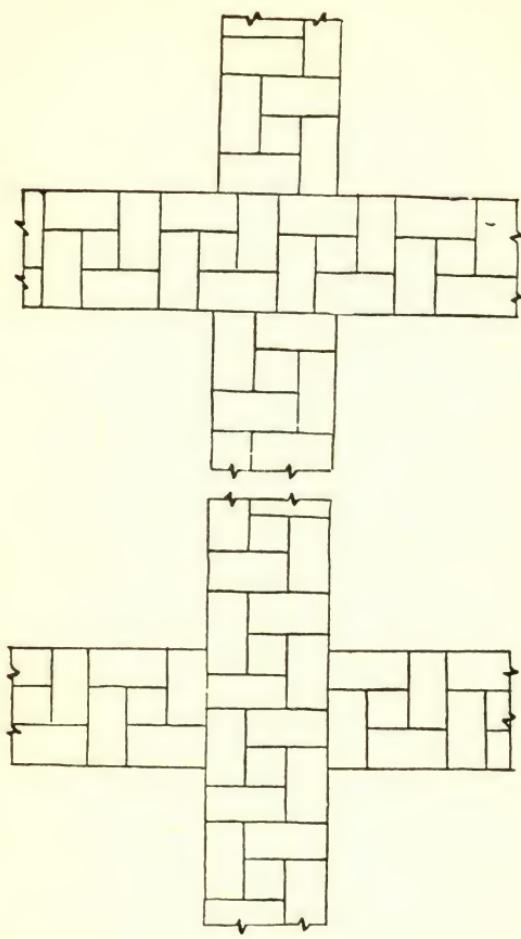


Fig. 129

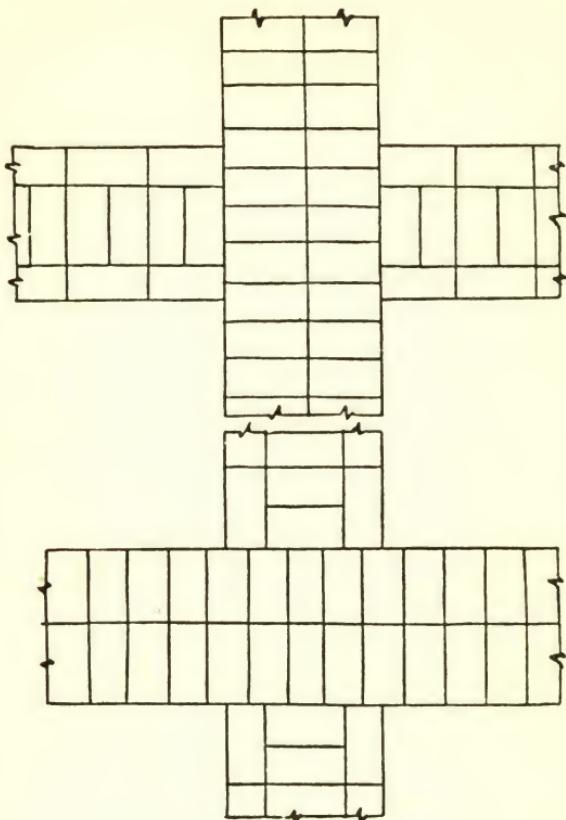


Fig. 130

EXAMPLE SHEETS OF BRICKWORK 121

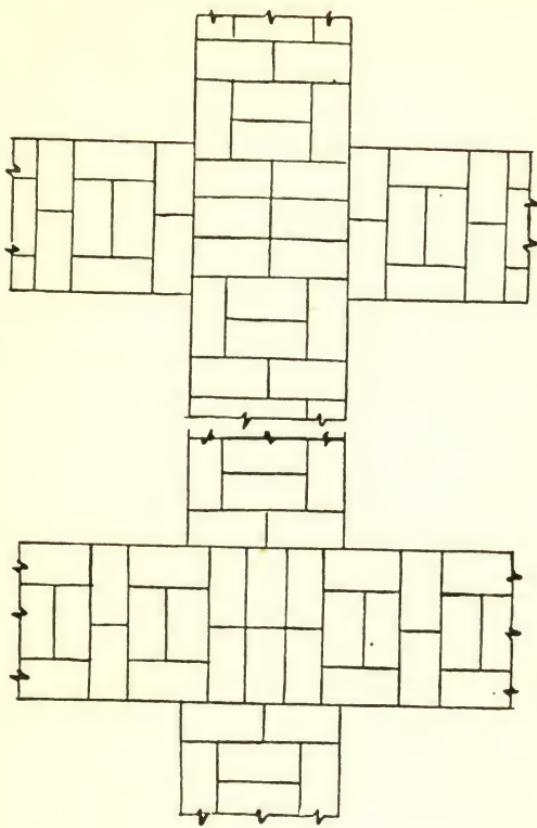


Fig. 131

122 BRICKLAYING FOR BEGINNERS

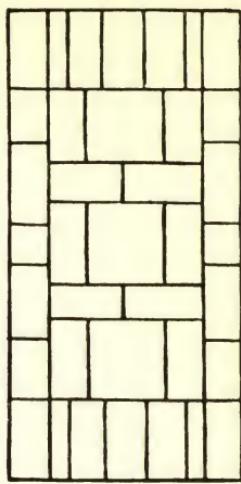
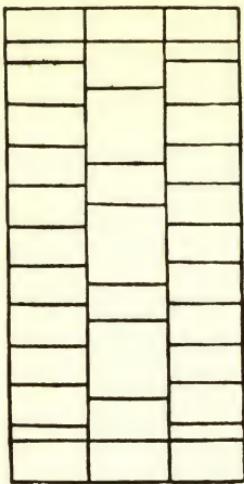


Fig. 133

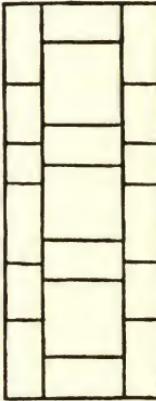
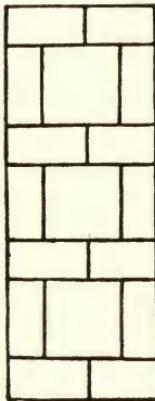


Fig. 132

EXAMPLE SHEETS OF BRICKWORK 123

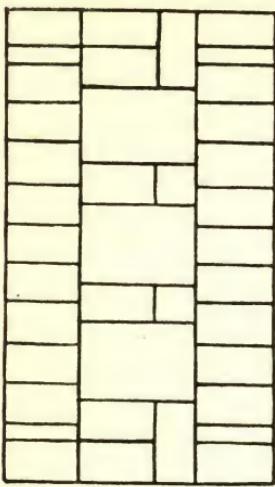


Fig. 134

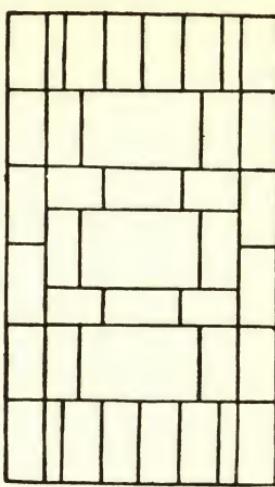
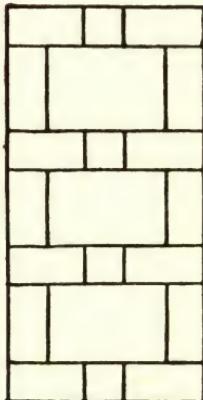
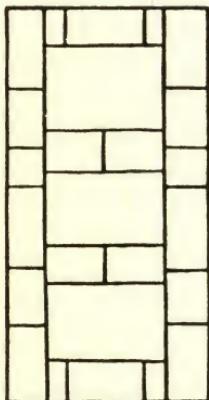


Fig. 135



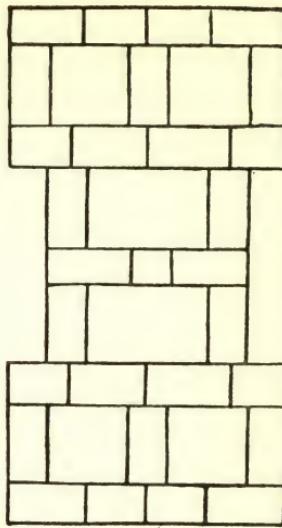
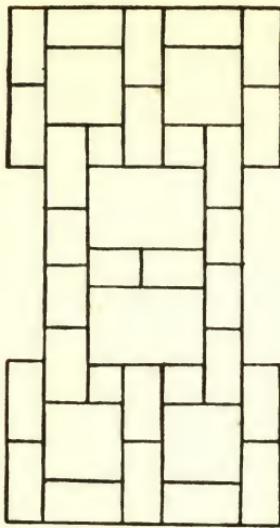


Fig. 137

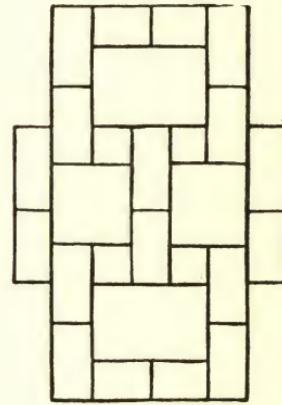
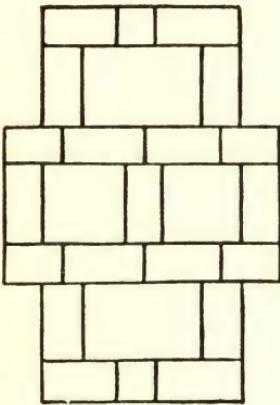


Fig. 136

CHAPTER XII

QUESTIONS AND ANSWERS

Question. What is the brick trowel used for?

Answer. The brick trowel is used for spreading mortar beds, forming cross joints, flushing up walls, and cutting bricks into various sizes.

Question. What is a brick?

Answer. A brick is a rectangular-shaped piece of burnt clay, generally used as a building unit in the construction of brickwork.

Question. Which is the correct way to lay a brick, frog facing upwards or downwards?

Answer. The brick should be laid with the frog facing upwards.

Question. Why is it the best method to lay a brick with the frog facing upwards, and the wrong method to lay it downwards?

Answer. When a brick is laid with its frog upwards, the reverse bed surface is flat; and when the brick is laid in this fashion on an evenly spread bed, and pressed down into its place, you are sure that the brick is resting on a solid bed. On the other hand if the frog is placed downwards on an evenly spread bed, or even a raised centre bed, you are not sure, when the brick is laid, that it is resting on a solid joint; in the majority of cases there is a hollow under the brick in the centre of the frog—this is detrimental to the brick, when pressure is applied above in the construction of the brickwork, causing therefore weakness at these points.

Question. What is the meaning of the term cross joint?

Answer. A cross joint is the material which forms the vertical joint between two bricks. The faces of these joints are called perpends.

Question. What is the meaning of the term bed joint?

Answer. A bed joint is the material which forms the horizontal joint between two courses of bricks.

Question. Why is it essential to spread a uniform and even bed of mortar?

Answer. In order to obtain a solid joint when the brick has been pressed down into its final position.

Question. What is the plumb-rule used for?

Answer. The plumb-rule is used for testing walls, in order to obtain the correct vertical face positions.

Question. What is the two-foot rule used for?

Answer. The two-foot rule is used for measuring various depths, lengths, and heights in relation to brickwork.

Question. How would you gauge the correct height of eleven courses at the quoin of a wall?

Answer. I would test the gauge by using a three-foot straight-edge, with 3in. divisions marked on it, by placing it against the angle of the quoin and comparing the horizontal division lines on the straight-edge with the top horizontal edges of each course of bricks. If both were in the same horizontal position, the gauge of the quoin would be correct.

Question. How would you test the top course of a pier 3ft. in length in relation to its horizontal level?

Answer. I should test the top course by holding a three-foot straight-edge on the course, from end to end, and placing a short spirit-level on the centre of the straight-edge.

Question. How would you cut a three-quarter bat $6\frac{3}{4}$ in. in length?

Answer. I should cut the three-quarter bat with the bolster and hammer. I should first mark the face of

the brick with a pencil line, getting the required length with the two-foot rule.

Question. What is meant by the term arris?

Answer. The edge of a brick, or the external angle which is formed by the meeting of two sides of the brick.

Question. What is cement mortar, and what is it used for?

Answer. Cement mortar is a composition of Portland cement and sand, mixed with water. The component parts usually being one part of Portland cement to three or four parts of sand. It is used for forming the various joints used in brickwork.

Question. What is a header?

Answer. A header is the end face of a brick; or a brick which is placed in a course with the end face showing is known as a header.

Question. What is a stretcher?

Answer. A stretcher is the side face of a brick; or a brick which is placed in a course with the side face showing is known as a stretcher; it is also the longitudinal face of the brick.

Question. What is toothing in relation to a brick wall?

Answer. Toothing is a method employed for a temporary finish of a wall; the courses finish with every alternate one projecting $2\frac{1}{4}$ in. beyond the other.

Question. What is meant by the term quoin?

Answer. A quoin is an external angle of a wall.

Question. What is a Queen closer?

Answer. A Queen closer is a portion of a whole brick; it is the same length and thickness, but only half the width.

Question. What are footing courses?

Answer. Footing courses are the base or foundation courses of a wall, and are built for the purpose of distributing the weight over a larger area of the foundations.

TWENTY GOOD TESTS FOR BEGINNERS IN
BRICKWORK

These special tests have been formulated in order to cultivate the mind of the young beginner in the various technical terms connected with the craft of bricklaying, to enable him to pick out, or distinguish in the least possible time, the right answers to a series of questions. The test is in the form of a series of questions, twenty in number, with triplicated answers to each. These answers contain one correct solution and two incorrect solutions to each of the questions given. The student should first read the question thoroughly, and then read the three answers to the same question, and try to pick out the correct answer in the set of the three answers. He should proceed to pick out the correct answers to the remaining triplicated sets of answers, or the answers which he considers are the correct solutions. Having completed the whole of the test, he should turn to the key page on which are listed all the correct solutions to the twenty questions and check up to see in how many answers (in triplicated form) he has managed to obtain the correct results. In the first try out of the test, the student may find that he has possibly picked out quite a number of wrong answers, but a second or third test may prove that the student can pick out the majority of the correct answers, and possibly the whole of them, in much quicker time than he did in the first test. When you have decided on one of the answers which, in your opinion, is the correct answer, you should tick the number down on a small slip of paper, from which you will be able to check the results of your answers when you turn to the key page. This method naturally follows for the answers in the rest of the test. These tests should prove valuable to the beginner in bricklaying, in training him to pick out the right solutions to technical terms in his trade; they also train his mind to acquire correct answers to other general questions connected with his trade and, will further, by studying the correct and incorrect way of doing things, prove most useful at a later

stage when taking theoretical and practical examinations in his particular trade. It will also train him to pick out bad faults in craftsmanship and enable him to correct them. It is quite easy to make mistakes or errors in any trade or calling, but it takes a man who is able to think to correct them.

Note. The student should try to obtain the one correct solution out of the three answers to each question given below. He should mark off the correct solutions on a slip of paper and then refer to the key page and check his results.

Question (1). What is a brick?

Answer (1). A piece of clay, hard burnt, used for building.

Answer (2). A rectangular block of burnt clay, used as a building unit.

Answer (3). A brick is 9in. \times 4½in. \times 3in.

Question (2). What is meant by the term "header"?

Answer (1). A header is the face of a brick in a wall.

Answer (2). A header is 4½in. \times 3in.

Answer (3). A header is the end face of a brick.

Question (3). Define the meaning of a cross-joint.

Answer (1). An upright joint in a wall between two bricks.

Answer (2). The material which forms the vertical joint between two bricks, and shows on the face of the wall.

Answer (3). A cross-joint is a joint between two bricks.

Question (4). What is a plumb-rule?

Answer (1). A bricklayer's tool used for obtaining vertical position of walls.

Answer (2). A wooden rule with lead bob attached for testing walls.

Answer (3). A tool used for testing walls and openings.

Question (5). What is a skewback?

Answer (1). The slanted line at the ends of an arch.

Answer (2). A construction of brickwork which slants.

Answer (3). The inclined surface of brickwork at each side of the arch, which takes the thrust.

Question (6). What is a putlog?

Answer (1). A piece of beech 6ft. long and 4in. wide and 4in. thick.

Answer (2). A piece of wood in scaffolding.

Answer (3). A putlog is used to lay the scaffold on.

Question (7). What is an arch?

Answer (1). An arch is a portion of brickwork covering an opening.

Answer (2). An arch consists of curved brickwork.

Answer (3). An arch is a construction of brickwork in the form of a curve consisting of wedge shape units which covers an opening.

Question (8). What is meant by English bond?

Answer (1) English bond are headers and stretchers placed in a wall.

Answer (2). English bond consists of alternate rows or courses of headers and stretchers.

Answer (3). English bond is much stronger than Flemish bond.

Question (9). What is a closer?

Answer (1). A closer is a quarter of a brick measuring 3in. \times 2 $\frac{1}{4}$ in. on the face and 4 $\frac{1}{2}$ in. in depth.

Answer (2). A closer is a small portion of brick next to corner.

Answer (3). A closer is a small brick measuring 3in. \times 2 $\frac{1}{4}$ in.

Question (10). What is a stopped end?

Answer (1). A stopped end is a face wall.

Answer (2). A stopped end is the formation of the end of a wall consisting of one vertical plane.

Answer (3). A stopped end is the finished end of a wall.

Question (11). What is cement mortar?

Answer (1). The material the bricklayer spreads with the trowel.

Answer (2). A composition of sand and cement mixed with water.

Answer (3). A good cement mixed with mortar.

Question (12). What is a fireplace opening?

Answer (1). A large opening in the wall.

Answer (2). A recess between two piers.

Answer (3). A recess between two jambs of a wall which is intended to take a stove or range.

Question (13). What is a chimney stack?

Answer (1). The brickwork which takes the smoke from the flue.

Answer (2). The brickwork above the roof which surrounds the flues.

Answer (3). The brickwork of the chimney flue.

Question (14). What is a chimney flue?

Answer (1). The space inside the chimney, which emits the smoke.

Answer (2). A chimney stack with brickwork around it.

Answer (3). 4½in. brickwork surrounds a flue.

Question (15). What is a withe?

Answer (1). A division wall in a stack which divides the flues.

Answer (2). Brickwork inside a chimney stack.

Answer (3). The 4½in. inside wall of a stack.

Question (16). What is a chimney bar?

Answer (1). A bar which is in a fireplace opening.

Answer (2). A shaped bar in the fireplace.

Answer (3). A slightly cambered bar, which supports the arch over a fireplace opening.

Question (17). What are footing courses?

Answer (1). The lower courses of a wall.

Answer (2). The base courses of a wall, which spread the weight of the wall over the foundation, each course being recessed back $2\frac{1}{4}$ in. on either side up to the proper width of the wall.

Answer (3). The base courses of a wall which is wider than the wall.

Question (18). What is an air brick?

Answer (1). A brick placed in a wall with holes in it.

Answer (2). A brick placed in the wall for air purposes.

Answer (3). A brick perforated with holes, placed in a proper position in a wall for the purpose of ventilation.

Question (19). What is a wall tie?

Answer (1). A piece of iron firmly bedded on a wall.

Answer (2). A shaped piece of iron, which is usually bedded on the two sections of a cavity wall, which acts as a tie, and stabilizes the two sections.

Answer (3). A piece of galvanized iron bedded on sections of a wall.

Question (20). What is a cement fillet?

Answer (1). A layer of cement and sand laid on a wall.

Answer (2). A triangular section of cement and sand usually laid along the internal angle of a wall.

Answer (3). A sectional length of cement and sand laid along a wall.

KEY PAGE

CORRECT SOLUTIONS TO TRIPLED ANSWERS

Question (1). Correct solution, Answer (2).
Question (2). Correct solution, Answer (3).
Question (3). Correct solution, Answer (2).
Question (4). Correct solution, Answer (1).
Question (5). Correct solution, Answer (3).
Question (6). Correct solution, Answer (1).
Question (7). Correct solution, Answer (3).
Question (8). Correct solution, Answer (2).
Question (9). Correct solution, Answer (1).
Question (10). Correct solution, Answer (2).
Question (11). Correct solution, Answer (2).
Question (12). Correct solution, Answer (3).
Question (13). Correct solution, Answer (2).
Question (14). Correct solution, Answer (1).
Question (15). Correct solution, Answer (1).
Question (16). Correct solution, Answer (3).
Question (17). Correct solution, Answer (2).
Question (18). Correct solution, Answer (3).
Question (19). Correct solution, Answer (2).
Question (20). Correct solution, Answer (2).

APPENDIX

RULES FOR BONDING BRICKWORK

VARIOUS BONDS

1. English bond consists of one course of headers and one course of stretchers alternately.

Flemish bond consists of stretchers and headers alternately in each course.

Dutch bond consists of one course of stretchers starting at the quoin with a three-quarter, the second course all headers, the third course three-quarter, header and stretchers following, the fourth course all headers. Repeat these four courses in the same order.

2. The bond must be set out on the face of the wall.

3. The distance by which the bricks in one course should overlap the bricks in the preceding course along the length of the wall is $2\frac{1}{4}$ in. The distance by which the headers overlap the stretchers at right angles to the face of the wall is $4\frac{1}{2}$ in.

4. A closer must be placed against the quoin header and continue the whole of its length 9 in. across the width of the wall.

5. The centre vertical line of the header should be in the same vertical line as the stretchers above and below.

6. All transverse joints must continue unbroken across the width of the wall, except when stopped by the centre of the stretcher.

7. Where there is an odd half-brick in the thickness of the wall, the course will consist of headers on one face and stretchers on the other. Where there is an even number of half-bricks in the thickness of the wall, the course will consist of the same bond on both faces of the wall.

RULES FOR BONDING FOOTING COURSES

1. The width of the bottom course of footings should be double the width of the wall.

2. Each course should be reduced in width by regular offsets of $2\frac{1}{4}$ in. on either side.

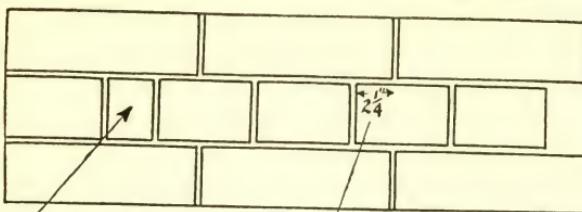
3. Bricks should be laid headerwise across the wall as far as possible.

4. Where there is an odd half-brick in the width of the footing course, stretchers should be placed in the half-brick space in the centre of the course, with the exception of the footing course, which contains three half-bricks in the width of the course.

5. In the footing courses to a quoin, a three-quarter should be placed in each course next to the quoin header in order to obtain the correct bond for neat work in the wall.

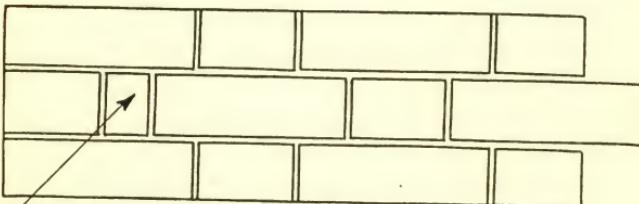
6. Where the width of the wall is two bricks or more, the bottom course of footings should be doubled in thickness.

ENGLISH BOND. (ELEVATION)
BONDS SET OUT ON FACE OF WALL



CLOSER NEXT TO QUOIN HEADER OVERLAP OF STRETCHER BEYOND HEADER

FLEMISH BOND. (ELEVATION)



CLOSER NEXT TO QUOIN HEADER

DUTCH BOND (ELEVATION)

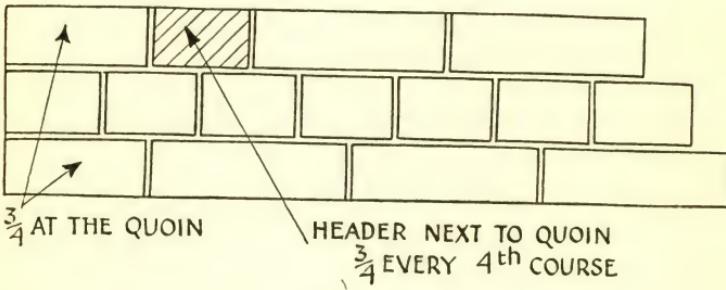
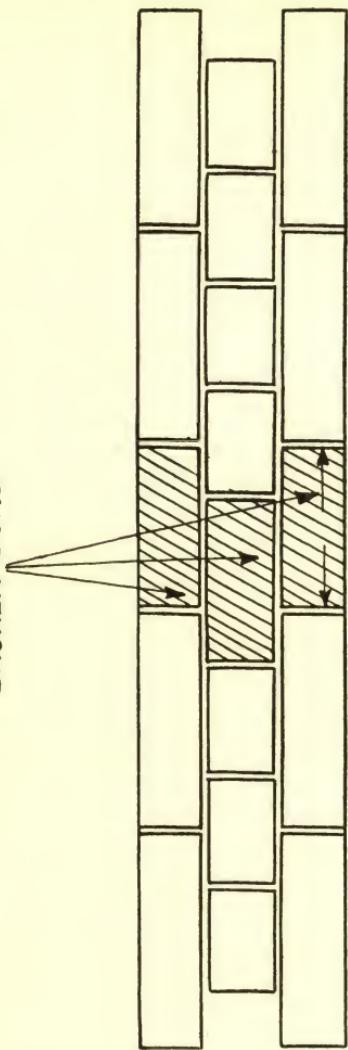


Fig. 138

BROKEN BOND IN ENGLISH AND FLEMISH

BROKEN BOND



BROKEN BOND

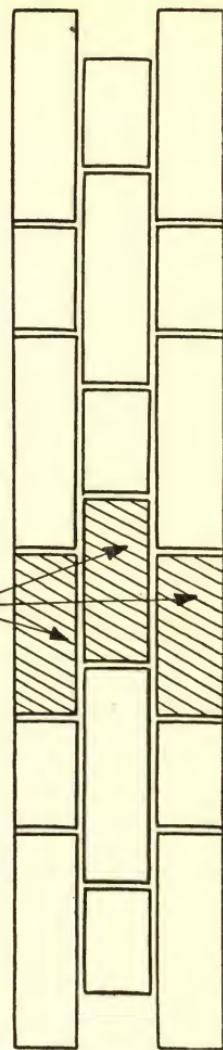


Fig. 139

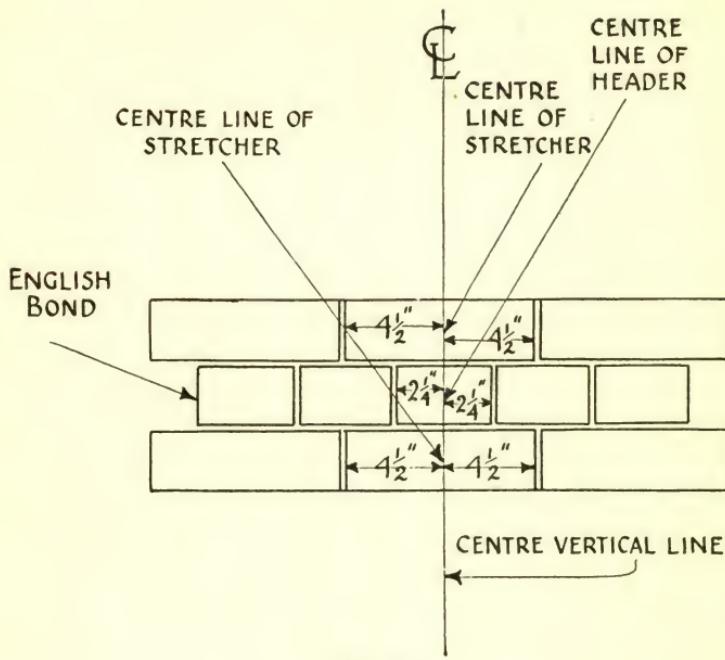


Fig. 140

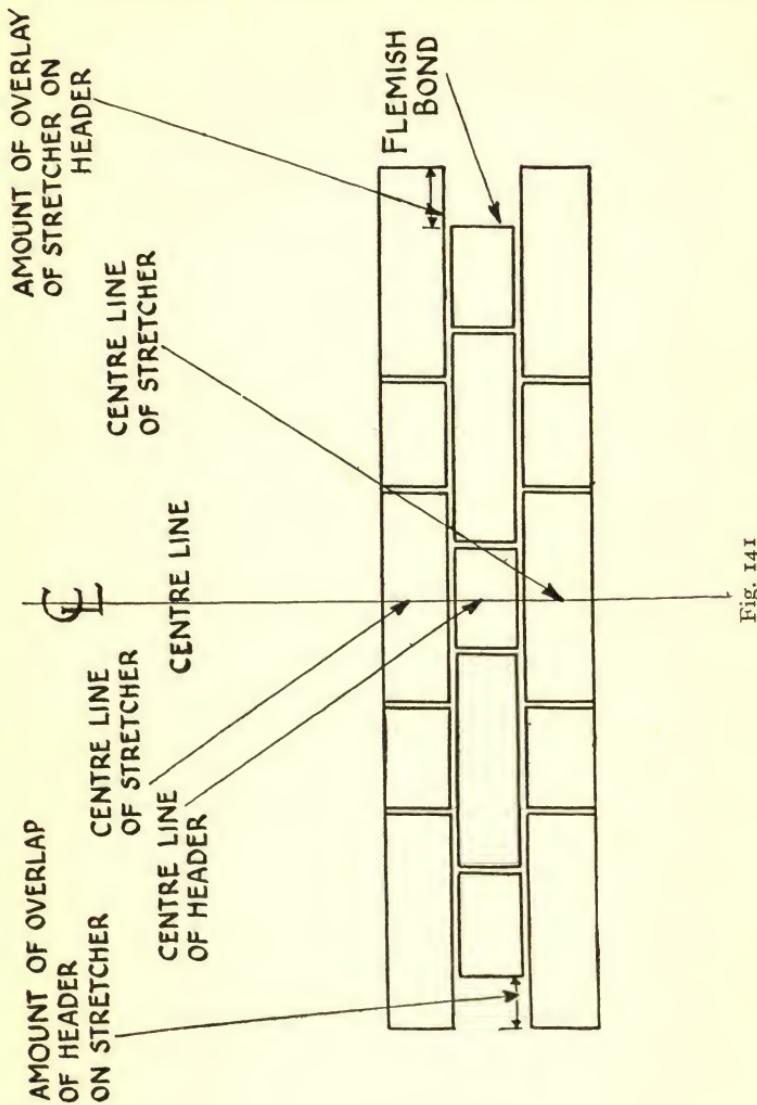


Fig. 141

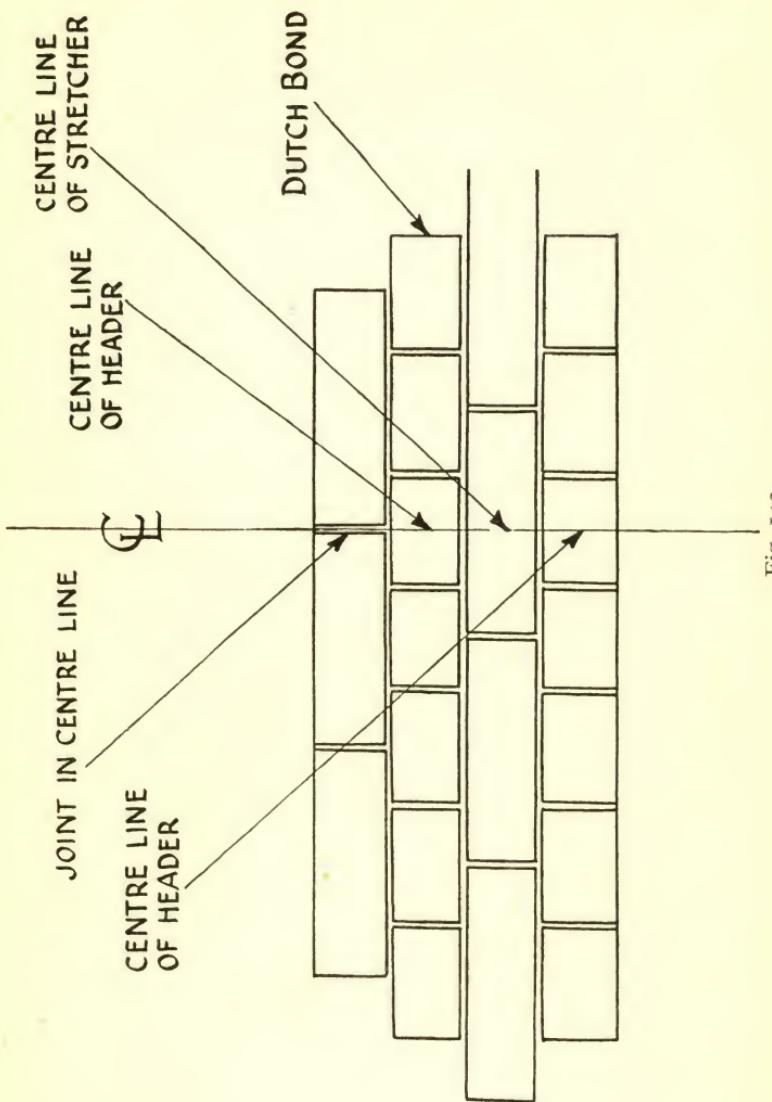


Fig. 142

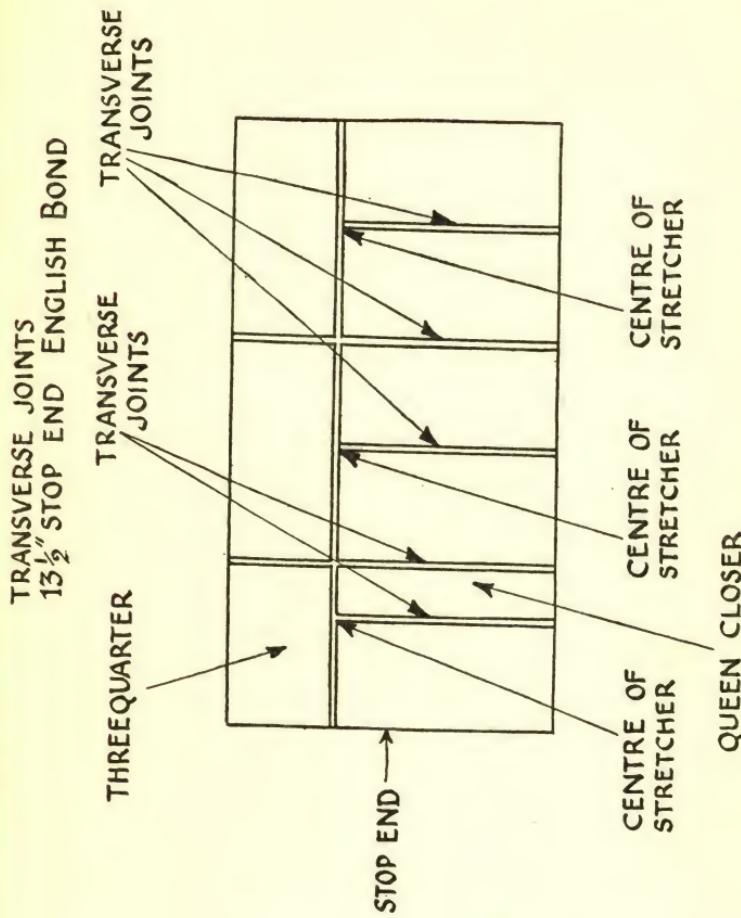


Fig. 143

1½ BRICK WALL ODD NUMBER OF HALF BRICKS IN THICKNESS OF WALL
HEADERS ONE FACE AND STRETCHERS THE OTHER FACE

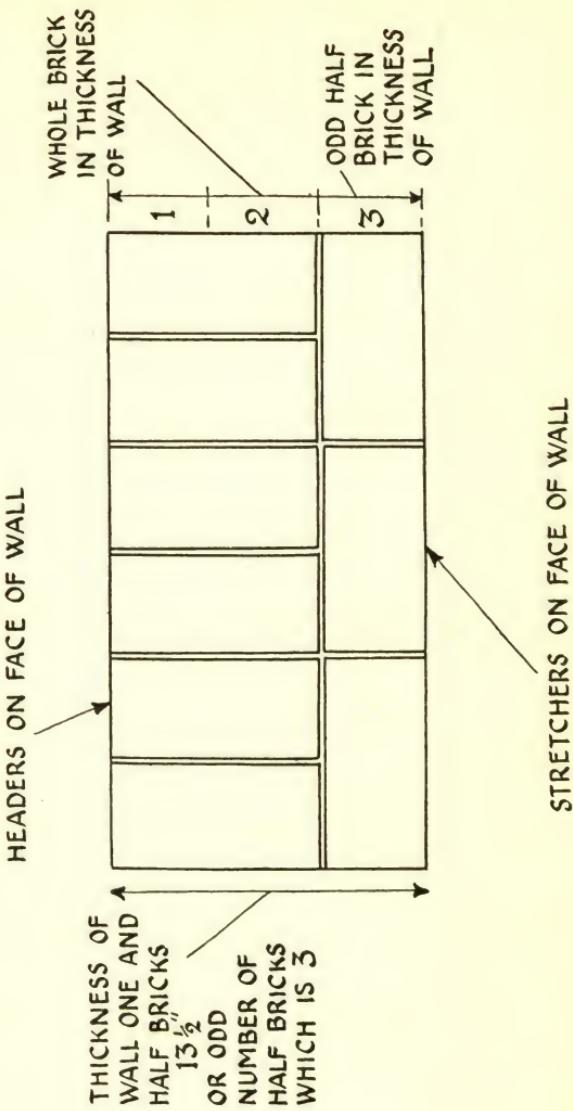


Fig. 144

LENGTH OF $2\frac{1}{2}$ BRICK WALL $5\frac{1}{2}$ BRICKS IN THICKNESS
No.5 BEING THE ODD HALF BRICK

STRETCHER FACE

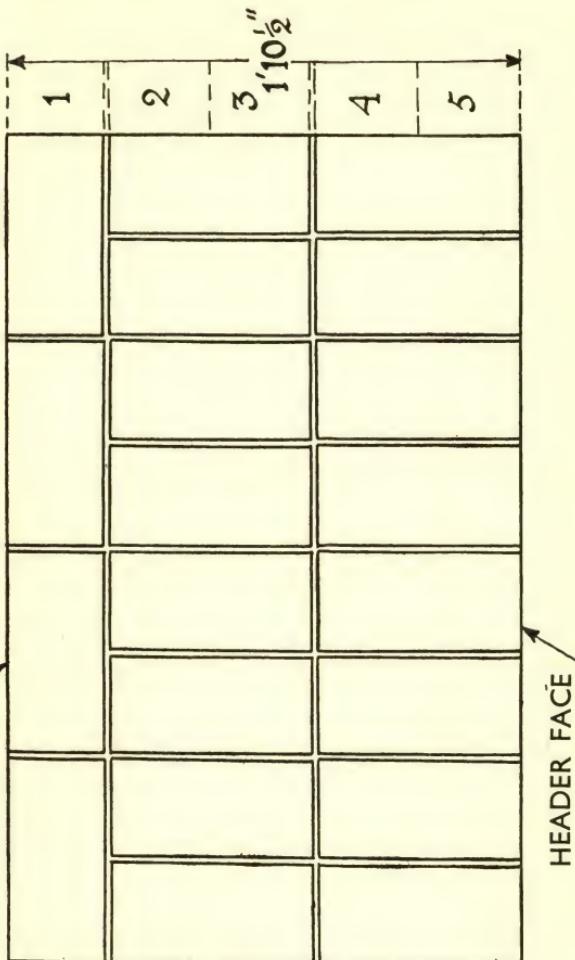


Fig. 145

SECTION OF A 9" WALL SHOWING FOOTING COURSES

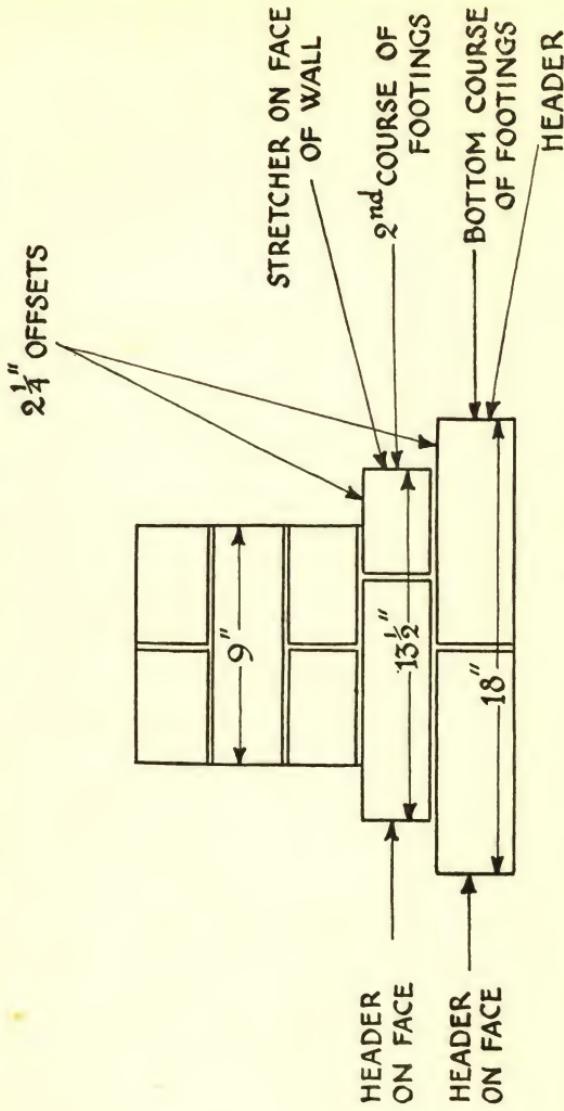


Fig. 146

2 BRICK WALL OR EVEN NUMBER OF HALF BRICKS
IN THICKNESS OF WALL

STRETCHERS ON BOTH FACES OF THE WALL

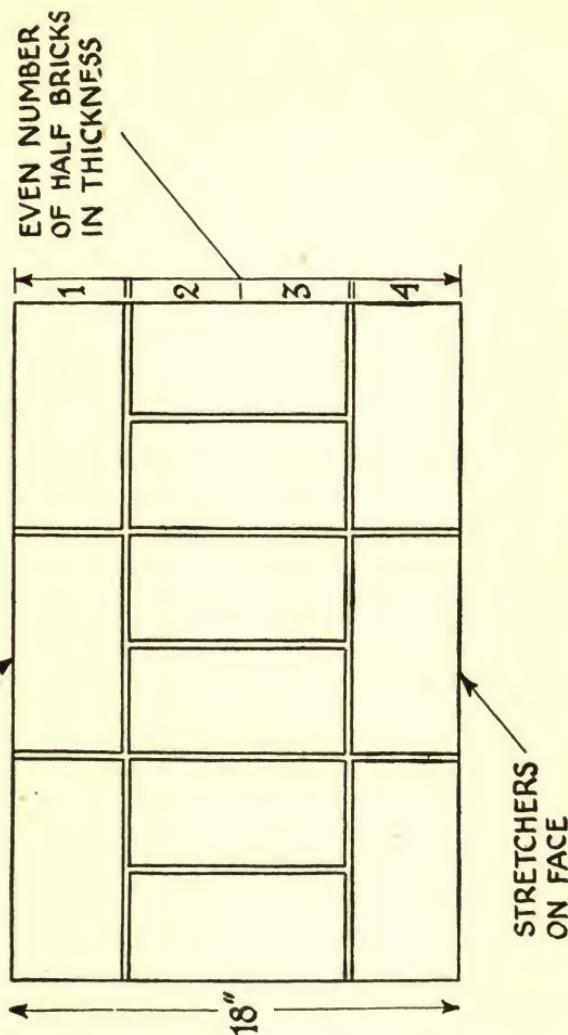


Fig. 147

WHERE THERE IS AN ODD HALF BRICK IN THICKNESS OF THE FOOTING COURSES THE STRETCHER SHOULD BE PLACED IN THE CENTRE. THE EXCEPTION BEING THE TOP COURSE OF FOOTINGS TO A 9" WALL IN WHICH CASE THERE ARE HEADERS ONE SIDE AND STRETCHERS THE OTHER SIDE

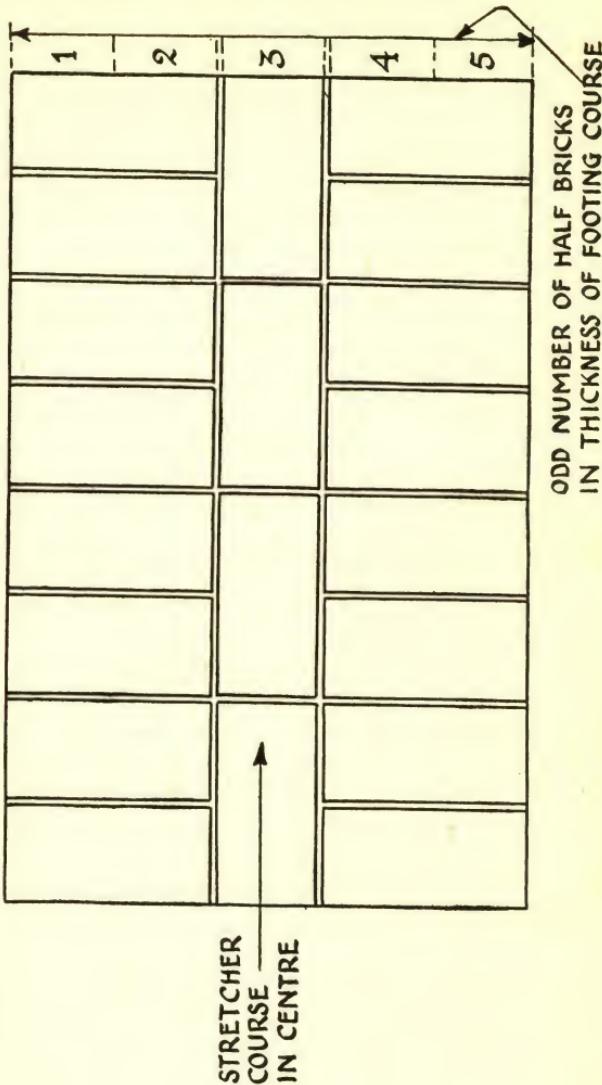


Fig. 148

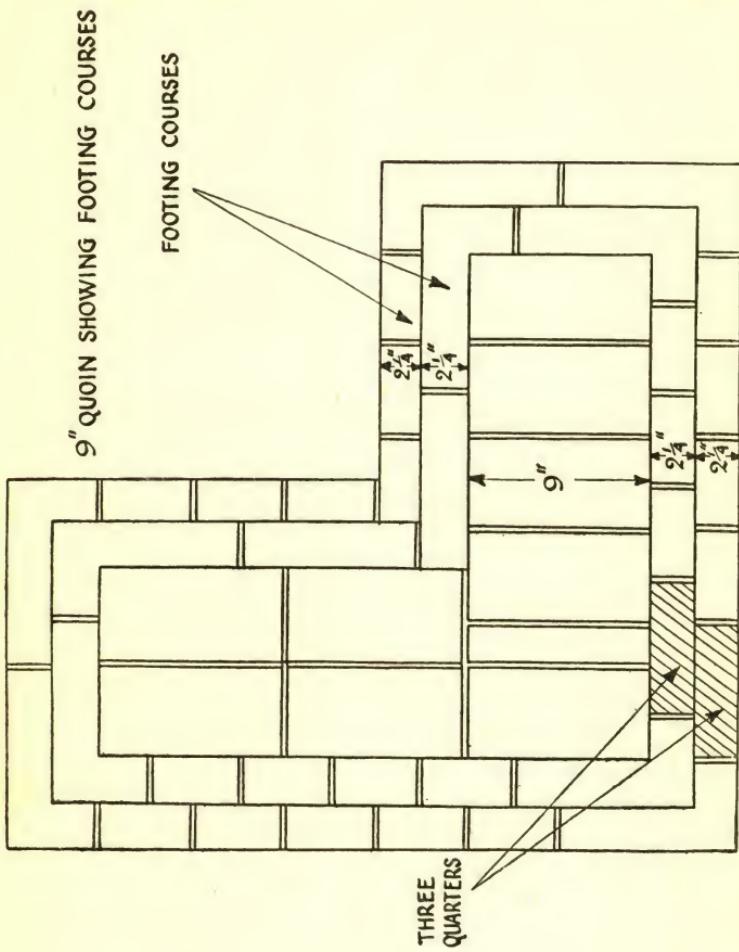


Fig. 149

SECTION OF A $2\frac{1}{2}$ BRICK WALL WITH ONE DOUBLE FOOTING COURSE

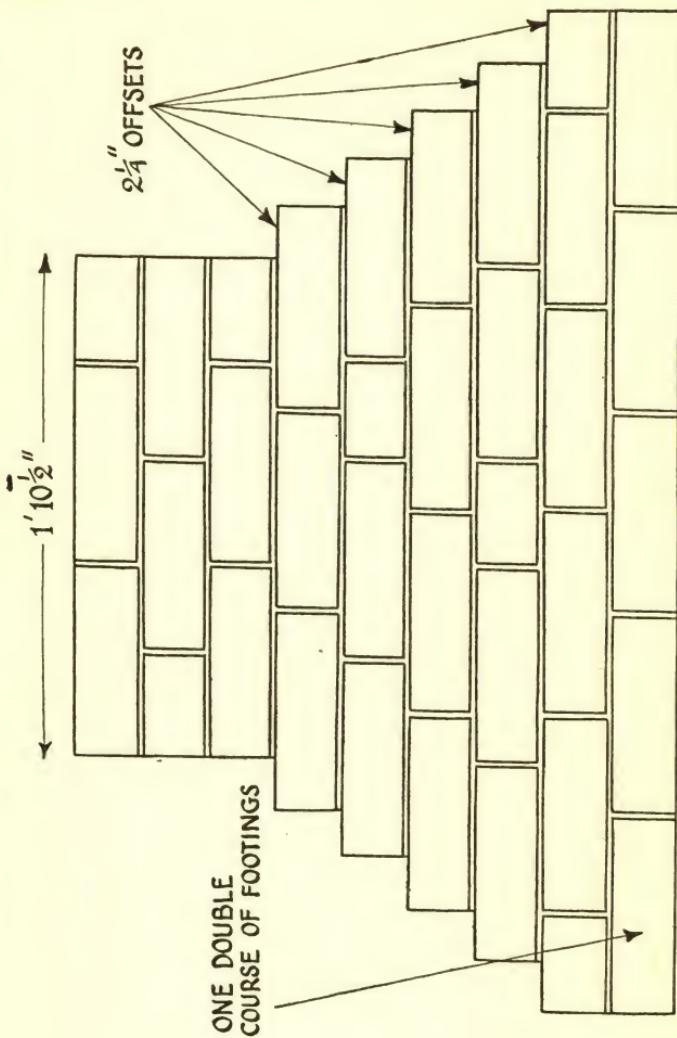


Fig. 150

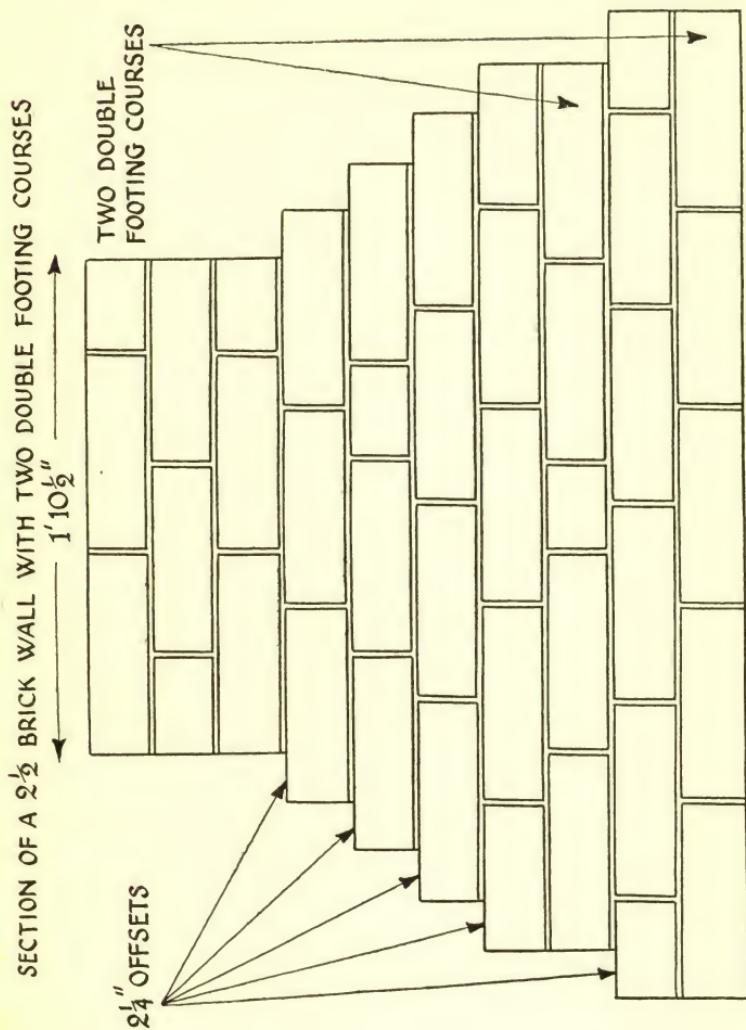


Fig. 151

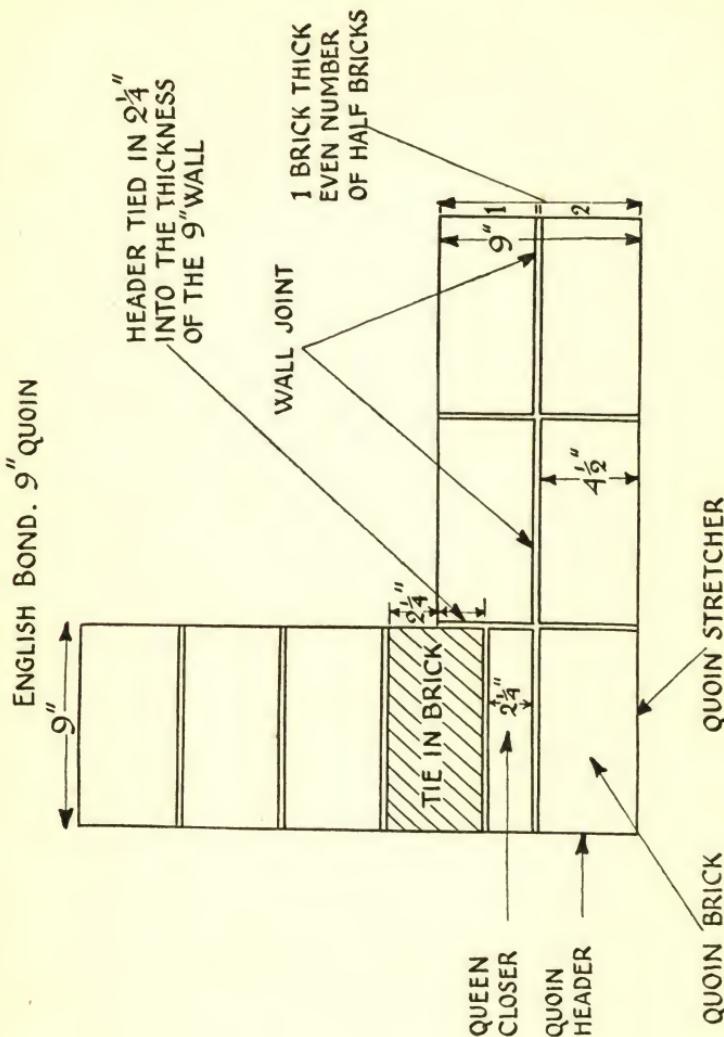


Fig. 152

RULES FOR BONDING BRICKWORK 151

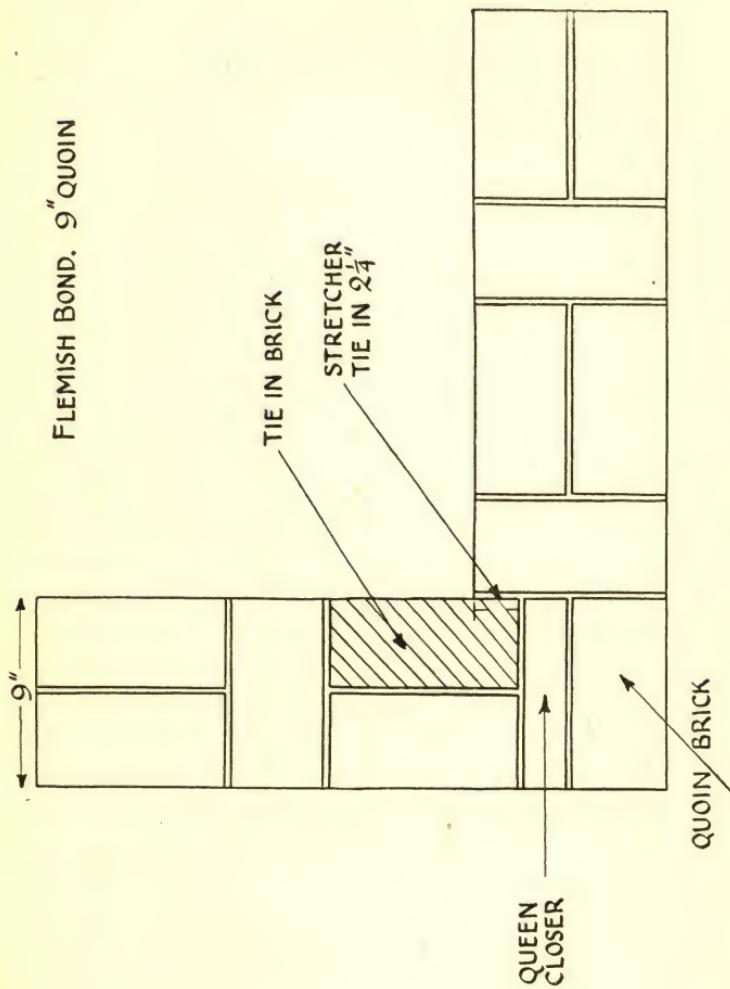


Fig. 153

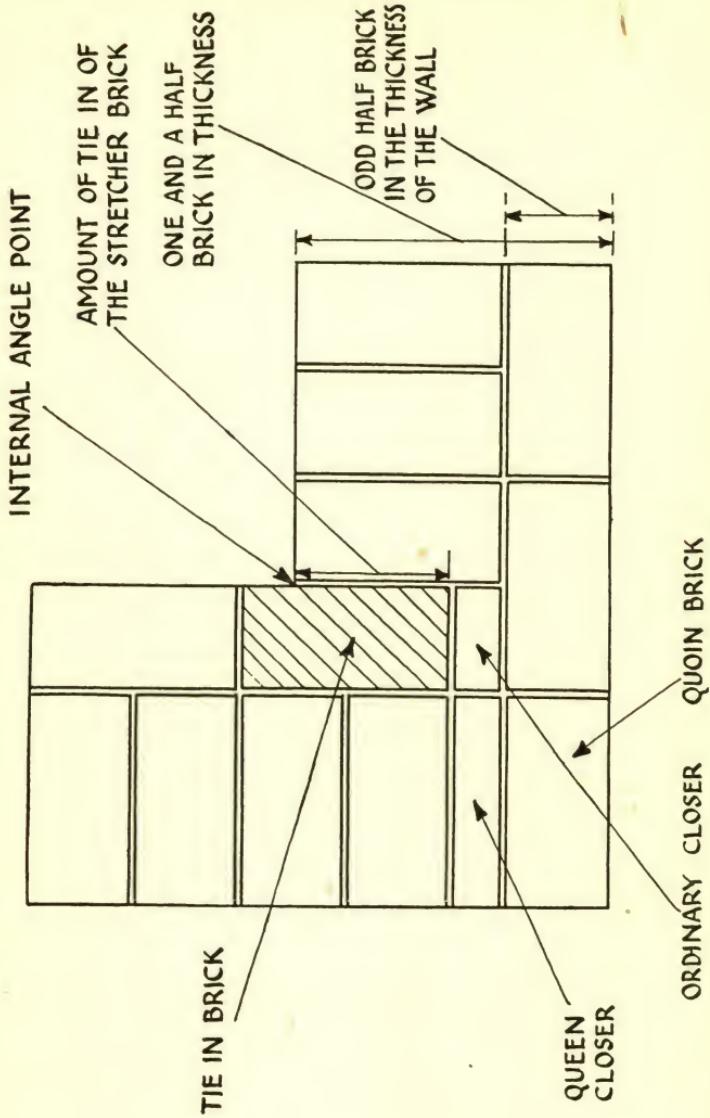


Fig. 154

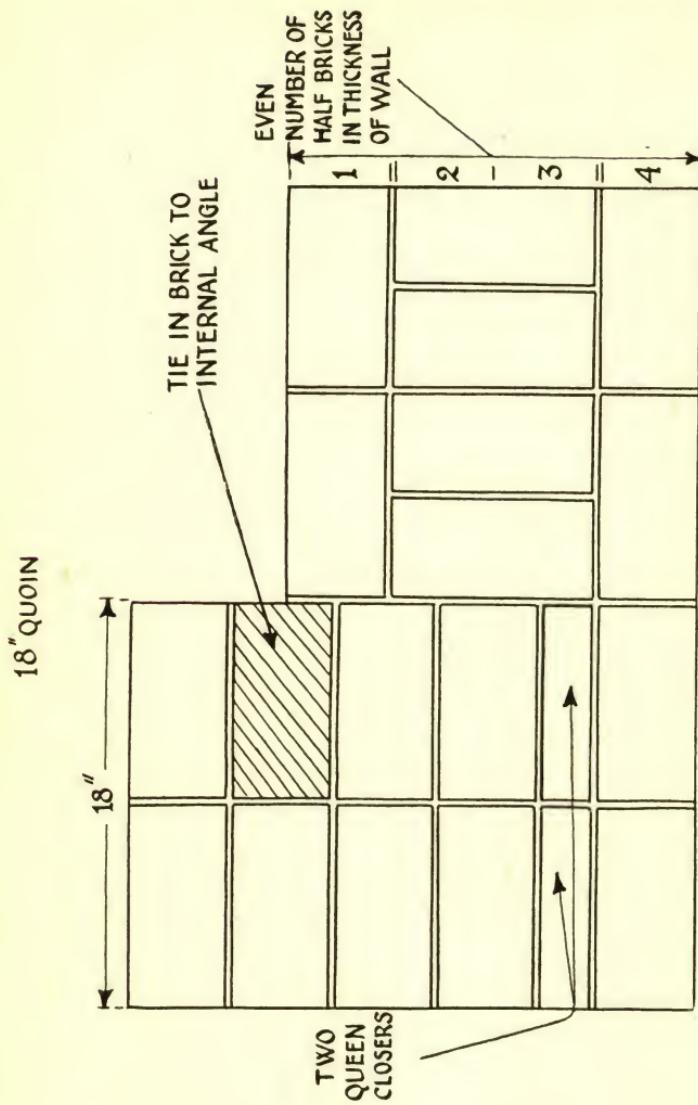


Fig. 155

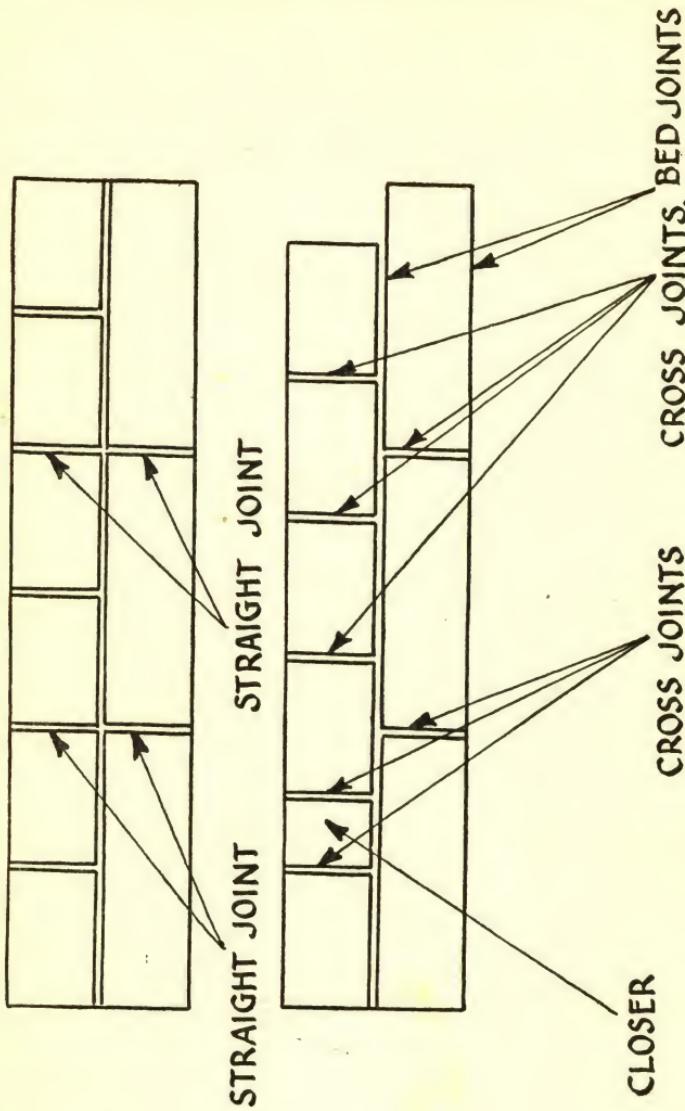


Fig. 156

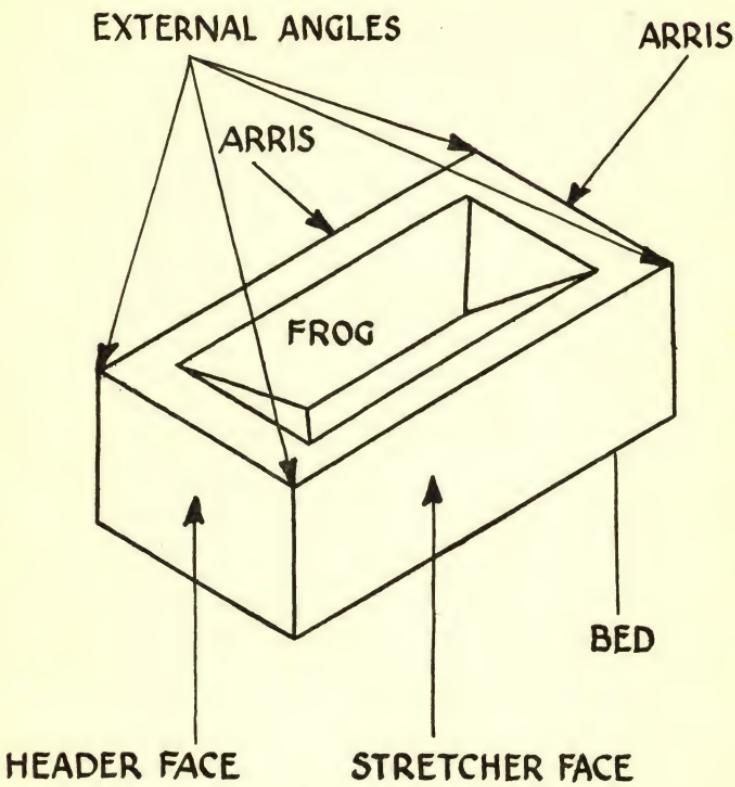


Fig. 157

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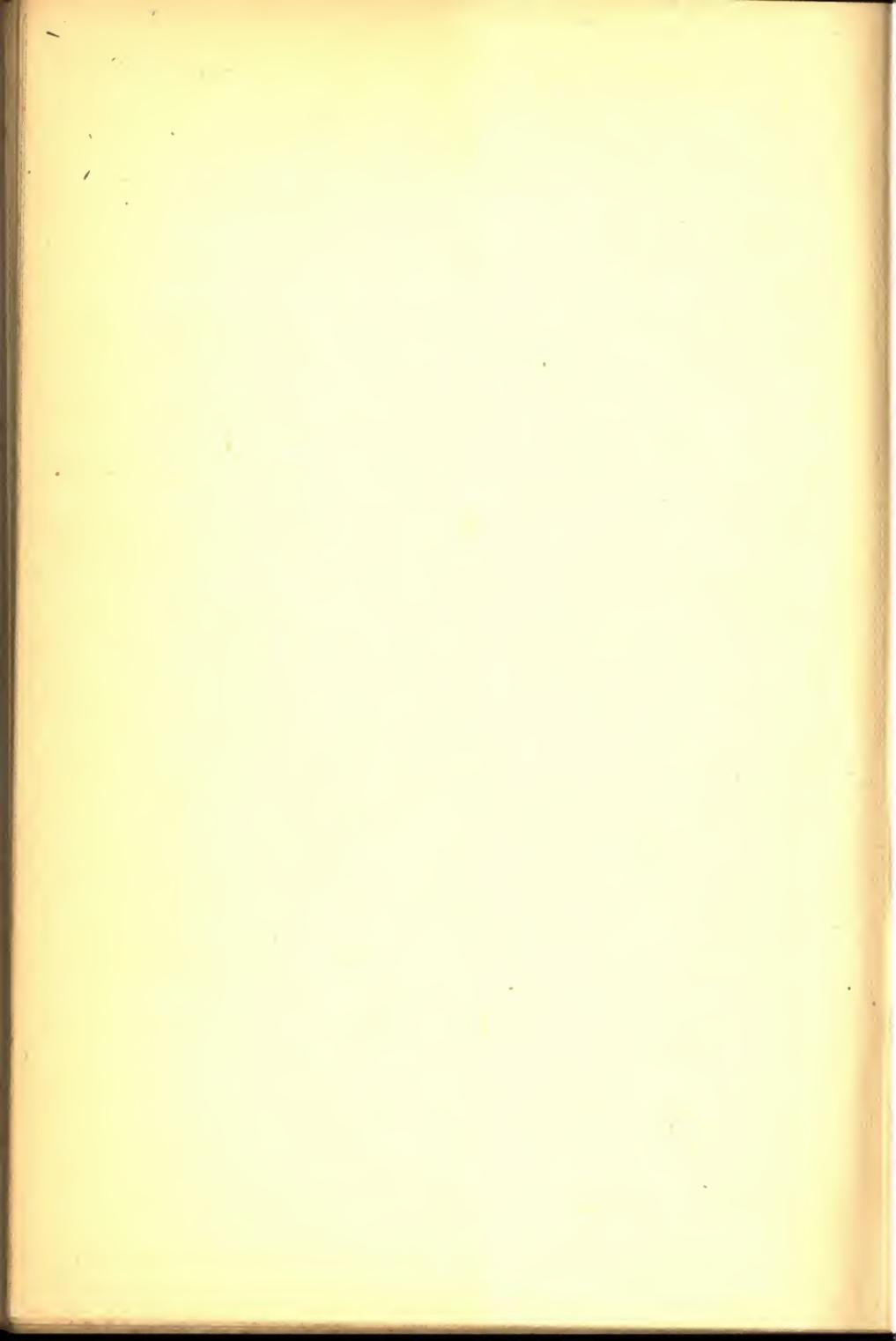
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